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THIRTY-SIXTH MEETING OF THE OIL SHALE ENVIRONMENTAL ADVISORY PANEL

Elk's Lodge - Vernal, Utah  
September 28-29, 1982

PANEL MEMEBERS AND INTERIOR OFFICIALS PRESENT

Henry O. Ash, Chairman

Harold M. Boeker, U.S. Fish and Wildlife Service, Denver

John R. Donnell, Industry, Littleton

Lloyd H. Ferguson, U.S. Bureau of Land Management District Manager, Vernal

Paul Ferraro, Colorado Department of Health, Denver

John M. Garr, Utah State Legislature, East Carbon City, Utah

Carter B. Gibbs, USDA, Forest Service, Ogden

Mary Ann Grasser, U.S. National Park Service, Denver

Wallace R. Hansen, U.S. Geological Survey, Denver

Andrew W. Heard, Jr., U.S. Bureau of Land Management, Colorado State Office,  
Denver

Fred J. Hempel, U.S. Department of Transportation, Federal Highway Administration,  
Denver

Charles R. Henderson, Uintah County, Vernal

Eric G. Hoffman, U.S. Minerals Management Service, Deputy Minerals Manager for  
Oil Shale, Grand Junction

Lowell L. Madsen, USDI Solicitor's Office, Denver

Dennis A. Montgomery, U.S. Bureau of Indian Affairs, Fort Duchesne, Utah

David Moore, U.S. Bureau of Land Management, Vernal

Albert G. Ouellette, Public Member, Avon, Colorado

Thomas E. Owen, U.S. Department of Energy, Laramie

B. Curtis Smith, U.S. Bureau of Land Management, Meeker

Larry Svoboda, U.S. Environmental Protection Agency, Denver

Steve Utter, U.S. Bureau of Mines, Denver

Clarke R. Watson, Industry, Denver

Beatrice E. Willard, Public Member, Boulder

W. Robert Wright, Public Member, Salt Lake City

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LIST OF ATTENDEES

Federal Agencies:

Bureau of Indian Affairs, Fort Duchesne, Utah

Ed Kurip  
Patrick J. Padio

Bureau of Land Management

Bob Leopold, Denver  
Terry L. Plummer, Craig

Minerals Management Service  
Oil Shale Office, Grand Junction

Don Johnson  
Lee Stevens  
Bob Elderkin  
Glen Miller

Oil Shale Panel Staff, Denver

Vernon Burns  
Elanor David  
Catherine Hurlbutt

Industry:

Argus Metals Company

Kurt Wunwicke, Boulder

Cathedral Bluffs Shale Oil Project, Grand Junction (C-b)

George Fosdick

Geokinetics, Inc.

Rusty Lundberg, Vernal

Ralph M. Parsons

Steven M. Byers, Pasadena

TOSCO Corporation

Paul Parker, Denver

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Federal Agencies:

Bureau of Indian Affairs, Fort Sherman, Utah

Ed Smith  
Patrick L. Parris

Bureau of Land Management

Bob Leibold, Denver  
Harry L. Plummer, Craig

Minerals Management Service  
Bl. Shale Project, Grand Junction

Don Johnson  
Lee Stevens  
Don Elbert  
Stan Miller

Bl. Shale Project, Denver

Bernard Baker  
Elmer David  
Catherine Burdett

Industry:

Argus Metals Company

Kurt Hummel, Boulder

Carnegie, Bluffs Shale Oil Project, Grand Junction (C-B)

George Folscher

Geophysical, Inc.

Harry Johnson, Vernal

John H. Parris

Steven H. Berg, Pasadena

USGS Corporation

Paul Parker, Denver

White River Shale Oil Corporation (U-a and U-b)

Ralph Deleonardis, Salt Lake City  
Robert B. Gilbert, Vernal  
Jim Godlove, Salt Lake City  
James S. Goff, Vernal  
Nettie Hale, Vernal  
Jack Lyman, Salt Lake City  
Rees Madsen, Salt Lake City  
Lowell Page, Pasadena  
Robert N. Pratt, Salt Lake City

News Media:

Bob Moore, Vernal Express  
Alan White, KUEN/KUIN Radio, Vernal  
Bob Woody, Tribune, Salt Lake City

Others:

Betty Burns, Golden

White River Shale Oil Corporation (U.S. and U.S.)

Ralph Nelson, Salt Lake City  
Robert B. Riggert, Vernal  
Jim Godlove, Salt Lake City  
James S. Goff, Vernal  
Katie Hale, Vernal  
Jack Lyman, Salt Lake City  
Renee Madison, Salt Lake City  
Lowell Page, Pasadena  
Robert W. Pratt, Salt Lake City

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THIRTY-SIXTH MEETING OF OIL SHALE ENVIRONMENTAL ADVISORY PANEL  
SEPTEMBER 28-29, 1982  
ELKS LODGE, VERNAL, UTAH

TUESDAY MORNING, September 28

Meeting called to order at 9:25 a.m. by Mr. Ash, Chairman.

MR. ASH: Good morning, I would like to convene this thirty-sixth meeting of the Oil Shale Environmental Advisory Panel. I'm afraid the Chairman committed the unpardonable sin of being late this morning. My apologies. We really had a nice flight over from Denver but it took a little longer than expected. The last time we met in Vernal was September 1979, about 3 years ago. At that time the White River Shale Project was still in a court ordered suspension, and it's nice to be back in Vernal and to know that the development is proceeding on tracts U-a and U-b and have the opportunity to visit that project.

Our last meeting was in May in Glenwood Springs. Since that time we have gotten an additional public member, it is Mr. Albert Ouellette of Avon, Colorado, who was appointed by Secretary Watt on July 9. I don't believe he was able to make this meeting. Are you present?

MR. OUELLETTE: Yes, I am glad to be here. I came through snow and rain and mud to get here, but I am here.

MR. ASH: We're delighted to have you here, we didn't realize you were going to be able to make it and we'd like to have you come up and join us at the panel. We appreciate having you here and we welcome you to the panel.

We have had some other changes in membership. Some of these will be noted as the members introduce themselves, and I think now would be a good time for us to begin with introductions of the panel members, and those of you who are either replacing a former member or sitting in for one, would you please identify that fact, let's start with the gentleman from Transportation.

Fred Hempel, Federal Highway Administration representing Patricia Keyes from the Office of the Secretary of Transportation.

Dennis Montgomery, a new Panel member replacing Dale Hamburg for the Bureau of Indian Affairs, Fort Duchesne Agency.

MR. ASH: And did you have some guests you wanted to introduce from the Tribe? We would be happy to have you do that, you said you might bring some.

MR. MONTGOMERY: We have Charley Cameron who is a geologist for the Ute Indian Tribe. We have Pat Padio and Ed Kurip, who work for Energy and Minerals, Ute Indian Tribe.

Larry Svoboda with the Environmental Protection Agency, in Denver, and I'm replacing Bill Geise on the Panel.

Andy Heard, alternate for Cecil Roberts, BLM, Denver.

Curt Smith, sitting in for Lee Carie out of Craig.

Lowell Madsen of the Regional Solicitor's Office, Interior, in Denver.

Bob Wright from Salt Lake City, I'm a public member of the Panel.

John Garr from the Utah House of Representatives, on the Panel.

Lloyd Ferguson, District Manager of the Bureau of Land Management in Vernal.

Wallace Hansen of the U.S. Geological Survey in Denver.

Chuck Henderson, Uintah County, Vernal.

Eric Hoffman, Oil Shale Office, Grand Junction.

Carter Gibbs, USDA, Forest Service, Ogden, Utah.

Clarke Watson, Westland Companies, industry representative, Denver.

John Donnell, Industry Representative from Denver.

Bettie Willard, at Large representative from the Colorado School of Mines.

Steve Utter, Bureau of Mines in Denver.

Hal Boeker, representing Fish and Wildlife Service out of Denver.

Paul Ferraro, representing Colorado Department of Health.

Thomas Owen from the Department of Energy, representing Arthur Hartstein.

MR. ASH: Thank you all. I would note the absence of one of our members - excuse me, Mary Ann.

MARY ANN GRASSER: That's what I get for coming in late. Representing the National Park Service.

MR. ASH: One of our faithful members is absent today, Deborah Linke from Reclamation out of Salt Lake City. The reason she's not here today is she was afraid that if she came we might have a first out on the tract today, the first baby born on the White River Shale Project, and I told her that if that happened she'd have to name him or her White River and she decided she'd stay in Salt Lake instead of taking that chance.

I don't know whether there is anyone else here that I've missed that I should be introducing. My apologies if I am. We will try to catch them later.

I would also note we have a new liaison person in Washington, George Thomas has been serving that role for us in the Assistant Secretary's Office. George was a

White House Fellow assigned to Interior and his one year was up and he has moved on from that assignment, and his replacement is Dan Sokolosky in Land and Water as the Liaison Officer.

I want to keep this introductory proceedings brief so that we can have time for the other reports and especially for White River Shale's briefing. I would like to take this opportunity to thank White River for the tour and especially their hospitality in providing lunch and hosting the evening get-together.

After our last meeting we provided formal advice or comment memoranda to Minerals Management Service in early June, and we distributed copies in June also to the members with minutes of that meeting. We have had three other mailings during this period, and we published the Federal Register notice September 14 and news release on September 20. I would note that copies of all these materials are available for inspection on the back table. Some things that just came out that I might note. This USGS water modeling report on the Piceance Basin, it will be of interest to those of you geologically inclined or interested in that particular aspect. There is also a new document from the White River Project, another Socio-economic report or plan.

At our Glenwood Springs meeting I reported to you that our charter expires October 31, and I said I hoped to advise of renewal action by the next meeting. It actually hasn't happened yet. The necessary materials were submitted to Land and Water by our office in August, and I was back there the end of August and early September and discussed the matter there, and generally the attitude and the views in Washington were to renew the Panel for another 2 years, and those are still the plans, though there is talk of some possible changes in the charter. However, it is still in the process and will require a Secretarial signature when the paperwork is done plus coordination with the General Services Administration, and I think OMB. I still am hopeful that this can be accomplished before October 31, when the existing charter expires. I would also note that there has been no further progress on the Oil Shale legislation in Congress. As you recall, the Warner Bill was reported out by the full Senate Energy and Natural Resources Committee early this year, but has not been scheduled for consideration by the full Senate. There is probably a remote chance of this taking place in the post-November 2nd session, and I believe that session is now certain that there will be one.

I want to turn to the agenda and note one addition that got left out of the final version of the agenda. At 9:45 I want to ask Bob Leopold to give us a status report if he can or if he will on the Department's new Oil Shale program. Some of this you're familiar with, you have received the draft EIS and we meant to schedule that in here this morning and would like to schedule that at the end of the other reports.

With that, we will turn to Eric Hoffman, who is the Acting Deputy Manager for Oil Shale for his report, and he can inform us what happened to Pete.

MR. HOFFMAN: Thank you, Hank. Well, let's see. Pete was reassigned to the Royalty Accounting Group in the Minerals Management Service in Denver to head up a Production Accounting and Auditing System Task Group, an effort to try to develop a program that would assure that all due and just royalties are in fact

being collected by the Federal Government. Not only has Pete departed but Jim Hager, the No. 2 man in the office, has also been reassigned and is now the Deputy Mineral Manager for Mining in Albuquerque, which kind of brings the office down to two less people and a lot more work to be done. I'm Eric Hoffman and I'm going to be the Acting DMM for Oil Shale until the position is permanently filled. If any of you are wondering where I came from, I have been with the office since its inception and I've served generally as the Environmental Scientist for the staff related to geology and other matters. The Oil Shale Office has been working with BLM in preparing and reviewing the Supplemental Prototype Oil Shale Leasing EIS and the Uintah Basin Synfuels EIS. We are also working with our headquarters office in Reston and with the MMS office in Salt Lake City on evaluation of the "in lieu" lands in Utah and the proposed lease tracts C-11 and C-18 here in Colorado. For these and other actions we have prepared a procedure for trying to evaluate the oil shale resources on these particular sites using net present value computer programs and DCF modeling. The Oil Shale office also has entered all of the 1980 and 81 environmental monitoring data that the lessees have provided into our computer formatted files and pretty much all of that data is in quite usable form. We've also assisted the lessees in carrying out sediment baseline characterization sampling on all of the tracts and the material has been turned over to "WRD" for initial analysis. This will probably give us our first real true comprehensive baseline on sediment characterization in the tract vicinity prior to Development.

The monitoring continues to indicate as far as air quality and meteorology are concerned that other than for particulates the pollutant levels on and about the oil shale tracts are at or near the threshold of detection. Specifically for tract C-a a suspension of operations was granted on August 1 of this year and this will remain in effect until legislation is enacted to give Interior authority to lease offtract sites for waste disposal and plant facilities. As part of that action the minimum royalty payments were postponed for 5 years and the 20-year lease term was extended 5 more years. On the tracts the workforce is now down to about 15 people and some of the mobile facilities have and are being moved off the tract.

The environmental monitoring statement of work has been scaled back. You had an opportunity to look at and comment on that statement of work at the last panel meeting and in essence it has been technically approved. We are presently working with the lessees to round out the final determination of site and other implementation problems. Once that's fully taken care of a final version of the monitoring scope of work will be provided to the Panel.

We understand that construction is continuing on the Lurgi test back at Harmarville, Pennsylvania, and that a bulk oil shale sample has been mined off the tract, crushed, screened and shipped. The reclamation bond for Tract C-a has been increased to \$4 million, and in August the mine dewatering system was switched over to a less expensive surface pumping system which does have separate streams for both mine water and retort water. This allows the mine to be flooded up to essentially the production separator room level. The system has been functioning normally except quite recently when there was a pump failure that has been fixed and the water level is on the way down and from what we can tell the bulkheads held and there was no comingling of retort and mine water. A test trench was dug through revegetation site R-3 and it was found that the processed shale beneath

was dry with little root penetration, things looked quite nice, in fact. And we've also been having good success with our cooperative study on planting a browsable species of sagebrush on the tract. We've had a good survival rate.

On tract C-b the workforce is now somewhere in the neighborhood of 180 individuals. However, that will drop off very dramatically by mid next month when equipping of all the headframes has been completed. The 15-foot-diameter ventilation escape shaft remains flooded, the 29-foot-diameter production shaft has been outfitted with down shaft loading facilities. two 9,500-hp hoists and hoist A has been roped up. The 34-foot-diameter service shaft has been equipped with two 300-hp auxiliary hoists and one 1500-hp. 240-man main cage and they have been roped up. The on-tract substation is in operation and the tract is now on permanent power provided over the Meeker to tract powerline. In July of this year the lessee was allowed to resume surface discharges of excess mine water under an NPDES permit. This was done primarily to reduce operating costs during the redesign interim period. Again test plantings of Hobbie Creek sage on tract C-b have had a good high survival rate and we are also cooperating with the lessee and the National Shrub Lab in a sage palatability study. It may be a little bit premature but it seems to be of noteworthy nature that the deer reflector study along Piceance Creek road has gone very well and while the statistics are extremely preliminary they suggest that where the reflectors were in operation there was an 80-percent reduction in the frequency of deer-vehicle accidents.

On the Utah tracts, you will hear a great deal more about their development status in just a few minutes. The access road is nearly completed and a considerable amount of earthwork has been carried out at the mine site. A DDP revision has been submitted, copies I believe have been passed on to you all requesting changes in the mine plan and development schedules, and we'll be discussing that at greater length tomorrow. The bonding level on tract has been set at \$2-1/2 million, an archeological clearance has been granted for both tracts and a PSD permit issued, and I understand the workforce at the moment is about 50 people. Drillino and testing of water supply wells in the alluvium along White River has been completed and the operating company for the tracts, as I said earlier, will be providing us with a great deal more information on their status. If you have any questions about what I've said, I've brought with me today Bob Elderkin, who is the C-a tract coordinator, as well as our range biologist and reclamation man, Lee Stevens is here, he is the new tract coordinator for Tract C-b, and is our air quality meteorologist, Don Johnson is here, he's the tract coordinator for the Utah tracts and is a process engineer. and of course Glen Miller is here and anything in the realm of water is fair game as far as he is concerned. Hank.

MR. ASH: Thank you, Eric. Questions or comments for Eric or his backup? We will have time tomorrow for discussion on some of these matters when we get to matters involving the individual tracts. I guess there are no comments or questions for Pete? I'm sorry Eric. Old habits are hard to break. We'll go now to the District Managers. Curt Smith for the Craig District Manager.

MR. SMITH: Thanks. Hank. As Eric indicated. there is very little activity with C-a and c-b in particular, from BLM's standpoint. We are doing a little reclamation on some rights-of-way to the tracts. like the 138-kv powerline to C-b, some of the natural gas lines to C-a, etc. Probably the big issue that we're involved with. of course is the prototype draft environmental impact statement. The

comment period ended for that on the 22nd of September. We're in the process now of analyzing those comments and we did receive a substantial number of comments from some various individuals and organizations and groups. We hope to complete the preliminary final environmental statement by the 20th of October and then we'll be briefing of course Washington and our State Office on that final statement, with the final statement being available to the public on December 3. We also just completed our scoping meeting for the resource management plan for Piceance Basin which will coincide with some of the things that Bob Leopold will be talking about on the programmatic statement for the permanent leasing program. The end of the scoping comments is the 22nd of October. We will start to crank on that resource management plan after the completion of course of the final impact statement for the prototype program. As a point of interest, something that has been involved with the program throughout its conception is the C-a to Rangely road. There is approximately 14 miles of that should be completed if it doesn't snow in the next day or two - at least by snowfall this year.

MR. ASH: Thank you. Curt. Comments or questions for Curt? Okay, Lloyd Ferguson. Vernal District Manager.

MR. FERGUSON: Thank you, Hank. First of all I'd like to introduce Dave Moore of my staff, who will be sitting in for me tomorrow on the Panel. Dave will be with us today. As Eric indicated (and I happen to know that Eric's been called worse things than Pete!) As Eric indicated, we've all been working at a number of things with their office and they're not necessarily related to what's going on in U-a and U-b, directly, but they are involved with oil shale and a number of other things. We had last week here in Vernal and also in Rangely and in Salt Lake City public hearings regarding the draft environmental statement on the Uintah Basin Synthetic Fuels projects. There are nine projects proposed by seven companies and we took our little dog and pony show around to those three locations and received public comments. We also will be receiving written comments up through October 19. As a matter of interest, we have some handouts on the back table, if you're interested in those, that you can pick up, and if you wish to make comments the address is in there, but it can be sent to me in care of BLM, 170 South 500 East Vernal, Utah. We've also issued the decision document indicating a willingness to issue a grant for construction of the White River Dam subject to finalization of the mitigation plan. This mitigation plan, and incidentally the final draft, I hope the final draft, was mailed from my office yesterday to Dan Lawrence, of the State Water Resources, for his scrutiny, and this is a plan worked up jointly by the Fish and Wildlife Service, Utah State Department of Natural Resources, including their Division of Wildlife Resources, and the Water Resources and BLM. Involved with that, with the deferment as far as the routes for any powerlines or access roads into the proposed drill pads, waiting the finalization of engineering report. We have also worked with Minerals Management Services and the folks from White River Shale regarding their access road, and the road that is under construction which you will see today from Bonanza south to Duck Rock, and it's at Duck Rock, where their road takes off and, the Good Lord willing, we'll make it there today. You'll also note as you go out today that the road from Vernal to Bonanza has been completed, or essentially completed at this end, the portion on this side was being surfaced last week but the bridge across the Green River is in good shape and we have a very nice road from here to Bonanza now, with expectations that it will be completed into the plant site.

We have also been working on another matter that might be of general interest to you, and that is the environmental statement regarding the issuance of tar sand leases, here in Utah, and that environmental statement is underway. We will be working with the various companies regarding their conversion, the proposed regulations for the permanent leasing program will be issued shortly, and we also are working on the conversion of conventional oil and gas leases to the combined hydrocarbon leases.

And last but not least. we're starting October 1 on our Bookcliff RMP. Resource Management Plan, which will include looking at the potential for additional energy leases in the Bookcliff resource area of the Vernal District which includes everything south, of - south and east of the Green River in Uintah county. There are a number of things ongoing that could very well be of interest to this group. Thank you.

MR. ASH: Thank you, Lloyd. Questions or comments for Lloyd? I have a question, Lloyd, on the White River Dam. What does this mean in terms of timetable for that dam or the State's plans?

MR. FERGUSON: Well, there are a number of things that haven't been finalized. They're doing some additional engineering work on the dam and its construction. They're also working closely with the Uintah-Ouray Tribe regarding some agreements on the dam. but what it really means is that we will be in a position to issue a grant, a right-of-way grant, for that location upon completion of the mitigation plan. The State has announced that they do not plan to start its construction until spring of 1984, so that's essentially where we're at. Hank.

MR. ASH: Will this mitigation plan then essentially resolve the questions and potential problems with endangered species? Or is that still lurking in the bushes somewhere?

MR. FERGUSON: No, this will include mitigation for the threatened and endangered species, namely. the hump-backed, bony-tailed chub and the squawfish and it also includes acquisition of properties for mitigation of big game areas lost and waterfowl areas and we're working very closely with them on those two projects.

MR. ASH: Thank you, Lloyd. I'd like to ask Bob, if he's willing, to give us at least a brief report on the new oil shale program of the Department. Bob Leopold, Bob is Oil Shale Program Manager for BLM and is located in the Colorado State Office of BLM, and Bob, if you would grab that mike there at the end of that table we'd appreciate it and we'll get you on tape that way.

MR. LEOPOLD: Hank, if I may go to one thing that I think would be of particular interest to this group. Some of you may have seen it, we call it the fact sheet on oil shale for what's going on in Colorado, Utah, and Wyoming. I think of particular interest, and I think help to everyone, if you would bear with me for just a moment I'd like to read some of the contents of this. For example, we have a fact sheet in there of what is oil shale, the history of oil shale, oil shale mining claims, what they are. I think of particular interest to this group is Who's who in Oil Shale. We've broken that down into private. Federal, state and local, other, and I think this would really help the group. We've also given a brief explanation of what's going on, as Curt explained, what's going on in the

prototype environmental impact statement, and for that matter, the entire prototype program, the new prototype program I might say. Also there's a brief explanation of what's going on in the programmatic environmental impact statement and regulations thereupon, and also the land use plans that are going on and anticipated going on in Colorado, Utah, and Wyoming, specifically as they apply to oil shale. There is also a brief explanation of the private oil shale development that is going on and is anticipated to go on. For example, the Chevron Project in Colorado. As Lloyd explained, the Uintah Basin Synfuels, there's a very brief statement on what's going on there. Also the Chevron-Pacific Project that is starting up as of this month. A brief explanation of the tar sands environmental impact statement and what's going on in relationship to the tar sands program. And I think of particular interest to everybody is a schedule of all these activities, with key dates for the public participation, key dates for everybody for that matter. And then it kind of closes up with a glossary, a terminology of all the buzz words that we tend to use sometimes, also those of interest to environmental groups and industry as well. Hank, if this group is interested, this particular production now is at the printers and should be available in roughly 4 to 5 weeks. So however you want to arrange it, people can contact you or they can contact anybody in the Bureau at any one of the District, Area or State Offices and may obtain a copy I would judge roughly November 1.

MR. ASH: Bob, I think if we can get copies, when they're ready, we can distribute them to all our panel members and also to the rest of our mailing list, make it known to others their availability.

MR. LEOPOLD: We'll be happy to work with you. A brief explanation of where we are on the programmatic environmental impact statement. The draft statement has been signed by the Director of BLM management, and the regulations on which that impact statement is based has been signed by Assistant Secretary Curruthers about 2-1/2 weeks ago. We plan on having both of those documents issued simultaneously to the public. I can't today give you a date when that may be. There's one interim step that must be done before they can be published and that has not happened yet. They must go to OMB for clearance. They legally have 60 days in which to review the document and perform what they perform on new regulations. I hope before December 1 that they will be able to hit the street. Our current plans are that we will have one hearing on the programmatic environmental impact statement, probably in Grand Junction. It will be done concurrently with the Regional Oil Shale team meeting. They will be done together. We will be holding information meetings with the public so they can perhaps more clearly understand the regulations so we can have a free exchange with them and also on the environmental impact statement. The purpose of that will be to inform and as I mentioned to exchange information, clarify it to the public so they can write their comments and perhaps do a better job and we do a better job in turn. It is anticipated right now that those meetings will be held roughly a week later than the Regional Oil Shale Team meeting. We anticipate having one of those in Denver, Vernal, Rock Springs, and perhaps Meeker. The final plans, times, and locations have not been consummated yet. We anticipate a full 60-day review by the public so that when we get final clearance from OMB to go ahead and issue these to the public, we will have the appropriate news releases. It will be in the Federal Register, and we anticipate having radio and TV coverage as well. Thank you, Hank.

MR. ASH: Thanks, Bob. Relative to some discussion at our last meeting about the relationship of our Panel to these other matters, what I found in Washington was almost a requirement, not exactly the right word to use, but my reading was that the separation of the two roles was clear and was intended to be maintained by Washington. As a matter of fact, one of the things I found myself doing in Washington was explaining why there wasn't any duplication so it appears that we will remain as we have been, individually invited to review and comment on things but without a formal role for this Panel in connection with what we might term the pre-lease activities, which is what Bob has been talking about. Our role, it appears will remain, at least at this time and for this time, tied to the prototype program alone. There's always a possibility of changes in the future, but at this time it appears that's the way things will go. John.

MR. DONNELL: I'd like to ask if the prototype leasing of either tract or both tracts C-11 and C-18 still on schedule? Will this be the end of March as anticipated?

MR. LEOPOLD: Right now it is anticipated we will be able to meet that date. We have a 2-weeks request which was granted for an extension to complete our final environmental impact statement, but it is anticipated right now that approximately the first of April is when that leasing will occur.

MR. ASH: Lowell Madsen.

MR. MADSEN: Do you know whether or not the new lease is going to require the development of the sodium deposits, unless there is a good reason for not doing it, or will it be like the lease that's now been issued?

MR. LEOPOLD: A very good question, Lowell. Our response to that in terms of the Bureau's position is that it will be a multimineral lease. It will be required in the lease, we are working with MMS right now to see, in fact, if we have any options. One such option may be that there may be certain periods within the lease which we may not require the three developed concurrently, in other words, at the same time. For example, if during the startup of the lease it is appropriate for the first couple of years for the winning lessee to develop nahcolite and postpone concurrent oil shale for a couple of years, that's something we're trying to work out. But our intent, and it will be very firm in the lease, is that we will require multimineral development, not only the development but the production of the same.

MR. ASH: Other comments or questions for Bob? Well Bob, I appreciate your coming and giving us a status report and we will be delighted to have you with us - will you be able to be here for the entire meeting and the field trip? (Yes.) Good.

MR. LEOPOLD: Well if anybody wants to get into it and know what else is going on, I would be happy to answer any questions.

MR. ASH: Okay, thanks again. Well, we're practically on schedule. We want to go to the pre-field trip briefing by the White River Shale Project staff, and they can give us whatever additional information on the field trip they feel is necessary. It looks like it will probably be muddy out there but maybe we've lucked out on weather and Eric, do you have any preliminary remarks?

MR. HOFFMAN: Not really, except that as Pete often did, turn it over to the capable hands of White River and their President, Bob Pratt.

MR. PRATT: Thanks, Hank and Eric. It's going to be dry out there today, the sun's going to shine, we're going to have a great time, particularly as you said according to my watch we're right on time, 10 o'clock. We've already had people out on the tracts, there are only two places we can slide off the road, and they're going to be dry by the time we met there. We're going to work you hard, we're going to have a good lunch, we're going to have a lot of fun.

During the next two days we're going to do two things. Tomorrow we want to present to you changes in our direction in our DDP and why we've made those changes, and Jim Godlove, our Director of Environmental Affairs, will discuss those with you tomorrow, and also Lowell Paige, our Mining Manager, will be here with you tomorrow to go through and detail what those changes are in our mine plans and in the DDP. Today, basically what we want to talk about are two things. One, we want to give you an opportunity to talk to us and ask us some questions about the financial impact statement and alleviation plan that I think all of you have received copies of previously, and secondly, as Eric has already done and we're going to have one of our men do it, we're going to tell you what you're going to see, we're going to show you what you're going to see, and tomorrow we want to tell you again what you did see. This, I think, is going to be a good afternoon for all of us. We have tents out there in case it does rain, but really the reason we got the tents was because of the sun, we didn't want it to be too hot while we're eating dinner bearing down on some of these heads. I'm talking about my own staff here, that is. Also, you will see a number of us with tags on that have WR for White River. Any questions that you have on the bus or any place else that we can take care of in answering for you, this we want to do.

There are two slides I want to show you today. You've seen this picture many times, I don't have to tell you about it today, and that is called Castle Rock. You can see that from any place out there today, and that's really what we're building out there, as some of our owners would say, it is a real castle when you look at the amount of money we're spending. I think you're going to be thrilled at the work that you see, and particularly those of you who haven't been out there before and those that haven't been out there for a long time.

This is a major scale. There is one thing I want to point out this morning. there are three major sections of that. There are three phases to this project. Basically we're on the first phase you can see there, where Rees is pointing, Phase No. 1, and we're proceeding with the engineering and right now we're in the middle of the mine development. That's the line you see along here. We're going to be in 1986, at that point in time, starting with the construction of our retorts and also going into the full development of the mine and with our construction. We are letting, it will be next week, the contract for our mine shaft, as well as, as Rees is pointing out, and we will be mobilizing for that and proceeding down with both our decline and a shaft, we'll talk to you more about that tomorrow, and you'll see a lot of it today.

Secondly, after Jack Lyman, our Director of External Affairs, talks about the socioeconomic impact today, I'm going to have Jim Goff, our Construction Manager, who is going to be with us all day and who is in charge of that construction line that you see there, tell you what you are going to see. The other point that

I wanted to make this morning, as you see Phase 3, that's the bottom portion of our slide down here, is that we're going to be finishing in 1987 with full production. There we're looking at between 106 and 120 thousand barrels of oil per day. So over this period we're going to be in a constant engineering, development, construction and operation mode as we go from what you see out there today until 1987, when we're in full production. One of the persons I wanted you to see, you've heard me talk about to him over here on the right, this is Cory Grua. Cory, just raise your hand. Cory is our Manager of Community Affairs, he's going to be on the bus with you today to give you all the local color as well as Jim Goff, and Jim Godlove, and again any of our people you see with the WR, you ask us, we'll get it for you today. So Jack, do you want to come on up and answer any questions or raise any points that you may want to concerning the financial impact statement?

MR. LYMAN: Thanks, Bob. Most of what I want to talk to you about today will be unrelated to the tract tour and the information you are going to receive tomorrow, and so I only want to take 5 or 10 minutes, and the main reason that we've asked for the time is that we think we've reached a major milestone in the area of socioeconomic impact mitigation. In 1981 the State of Utah passed a law which is referred to as SB-170 which requires that major developers submit to the State a financial impact statement and alleviation plan. The effect of this law, the reason for the law, was to ensure that major energy developers coming into the State of Utah gather the information necessary, share it with local and State officials, so that the proper planning could take place to anticipate and to mitigate the impacts of large-scale developments. As part of the DDP submission a year ago, you received a community support and infra-structure study which was the first attempt by the company to try to identify some of these impacts. We took basically that report and have updated it in some significant ways and have created what now constitutes our SB-170 filing. This document has been submitted to local officials 2 weeks ago. I was out here in Vernal, we met with all local affected entities, distributed the material, asked them to review that and then to get back to us their response and their comments. Yesterday the official transmittal in terms of compliance with the state law took place as Bob Pratt transmitted this document to Governor Matheson explaining what was in the material and what our intentions were. I will just briefly describe this document and then be happy to answer any of your questions.

Essentially what we've done in the format of the document is we've described three separate sets of conditions: The existing conditions, the baseline conditions which would be the expected growth in this area absent development of the White River Shale Project, and then the expected conditions with our project on top of the baseline. The areas that are covered in the report are population projections, employment, income, the fiscal structures of the local governments, housing, education, post-secondary education, health care, law enforcement, fire protection, water, sewage treatment, solid wastes, recreation, social services, transportation, non-Government public utilities. We're proud of this work that we've done. We are the first company to have to comply with this SB-170 and to to complete this filing, and so we were kind of creating our own path as we went through. We worked very closely with state and local officials and I think everybody involved in the process has been very pleased with it.

For those of you that have reviewed the material that you received a year ago, which we refer to as the Gibbs and Hill Study, those were our consultants. There are some fundamental differences in the material that you've seen today. One is that we have tried to update the information so that it is as current as possible. Secondly, we've been able to include as a result of a cost-revenue study we're doing the current fiscal structures of the local governments. That was unavailable before. But perhaps the most important change is in the area of population projections. In the previous work the consultants developed their own population projection modeling and used what they called a gravity model to distribute that population in this region. Probably the most significant criticism of that work by state and local officials was the questioning of those population projections. For any of you that have had to deal with demographers and state planners before you understand how important some people consider population projections, and it's very much, it's a very difficult situation to deal with. After discussing this at greater length with state and local officials we finally reached a decision to use the official State of Utah Population Projection Modeling, and I'm not in a position here today to defend to you the accuracy or how complete that modeling is. I know that Governor Matheson has issued an Executive Order that requires all state agencies to use that in their population forecasting. It's a model that has been thoroughly reviewed by local officials. I'll be the first to admit that there isn't 100 percent agreement with the kind of numbers it generates, but it is something they are familiar with, and it is something that they can deal with, and that they can respond back to us where they see some discrepancies or where they have some problems with it. So that is probably the most fundamental change. That also has had an effect, then in using that state model, in affecting the geographic distribution of our expected population. As you review this material you'll see that a much smaller percentage of our expected workforce will be in the western Colorado-Rangely area than had been previously indicated.

I want to bring you up to date on our current situation. We've submitted to the Oil Shale Office our quarterly monitoring report that indicated that as of July 1 we had 41 people employed by the project out here in the Vernal area. Those monitoring reports will continue on a quarterly basis. After we've selected our mine contractor we'll be dealing with them to get a better estimate of the size of the workforce that they expect. Right now we expect somewhere in the neighborhood of 100 to 120 people involved in that mine development work over the next 2 to 3 years. At one time our original expectation was to house those people in an on-tract construction camp. Engineering work had been completed on that, cost estimates had been received, and that gave us reason to take a look at exactly how we were going to house these people. We came to the local officials and indicated to them that we were in a position to house those people on tract, even though it was what we thought more expensive than anticipated. The response we got back from the local officials was that they preferred that we try to house those people in existing housing in the Vernal community. As you may be aware, the unemployment rate in the Vernal area is now in the neighborhood of 8 percent. Less than a year ago it was lower than three. There has been a tremendous construction of housing in this area and with the economic times not only in the region but of the country those houses have not been moving as rapidly as they had hoped, and the county commissioners indicated to us that they would prefer that we come in; that there

was adequate and affordable existing housing of all types, single family dwellings, apartments, motels, condominiums, townhouses, mobile home spaces and the one concern they had was perhaps a lack of adequate RV spaces but their preference was that this population not be housed that way anyway. So they recommended to us that we bring the people to town. In our discussions with the mining contractors they also expressed a preference, indicating that they did not consider our site a remote site in the sense of a mining operation and that they would prefer to house their people locally. And so that is our current plan, right now we've been working closely with the Chamber of Commerce here in town. They run a housing referral service which is updated on a weekly basis and provides information on available units and rates, and as we identify a contractor we will set up a housing referral program to assist those workers that are not in the local area now in finding adequate housing when they move to town.

Additionally, then we will take this report after it's been reviewed by the local officials and try and identify what some of the impacts will be of that population size and hopefully we will be able to negotiate and sign mitigation agreements to make sure that the communities can deal with the growth that we have.

And then as a final note I'd like to mention that two weeks ago we signed a contract with Valeu and Associates out of North Dakota to examine the long-term housing needs of this project and to develop a comprehensive housing strategy for the project through construction which would be through 1996. We hope to have the results of that effort soon after the first of the year and we will then be able to come up with a definitive plan of how we plan to house our workforce after 1986. I'd be happy to answer any questions if there are any.

MR. WATSON: I was just curious as to the somewhat rapid leap in unemployment. You said 3 percent to 8 percent in 1 year?

MR. LYMAN: Primarily as a result of decline in oil and gas activities in the area. If there are no other questions, then I'll turn it over to Jim Goff, our Construction Manager.

MR. GOFF: Ladies and gentlemen. My name's Jim Goff and I am the Construction Manager for White River. You've all heard the saying "You can't get there from here." As Lowell indicated, we are going to get part way on this new road that the County has put in to Bonanza. Then we're going to have about 8 miles of fairly rough road, the majority of the material has been moved, they're putting the subbase on some of it, and some of the granular borrow fill on our other portions of it. The bridge is under construction, the White River bridge, the north and the south abutments - the concrete has been placed, the south pier has had the hammerhead cast last week and they are forming on the north side, so we're about to set the bridge booms. As you know, White River has a very active interest in this portion of the road, it will connect the access road and the new road that the County has just about completed. I'd like to show you a few slides of what you will see. The slides are very difficult to keep up to date as things are moving very rapidly.

This is some of the activity, we're just starting on the county road, working our way through some of the cuts that lead down to the river. This is the cut just

north of the White River at almost the final elevation. We've moved back farther south and you see the two bridges, with the dirt one being constructed. The old steel bridge of course is the first bridge that was used. Off to the left is the concrete bridge that a great deal of the material has been hauled over, it's covered with dirt and mud at the present time, and it's very difficult to see. In the right you see a crane boom. That's working on the south pier. The north pier you can see is being formed. Now the concrete has been cast for this now and when we go by we'll bring you up to date on exactly the status.

This is one of the bridge beams that will be placed probably starting next week. I wanted to show you the magnitude or the size of these by placing a car there. When we get to the site we'll look at and discuss the condition of the road, the mine site earth earthworks, the mine service building, the water system, that's the water treatment system, the runoff pond, power supply, and communications. The ventilation shaft and the production decline. Give you the immediate status on those, show you the locations and the general activity going on today.

To give you a little bit of idea of what's been accomplished through the summer, this is one of the cuts that is on the access road. I've got several pictures following that show you the progression of this particular cut, and now we are laying asphalt. It would be very nice if that could happen quite that fast in real life. I wanted to point out also that 99 percent of the material used to build this road was rock and it had to be blasted, and the contractor worked all the rock into the slopes with a cat and you can see the cat tracks running up and down the slope. We have stockpiled the topsoil and placed it back on the slopes and we are in just about the process to start seeding. It would have been nice to have had that seeded a couple of weeks ago, it really would have got off to a good start.

This is some of the equipment that you'll see working in various places. This is one of the drills that the contractor has. Some of the equipment is fairly good sized, you don't normally see this size of equipment on a road construction job, that loader is a 14-yard loader. That's a 70-ton truck, so you see the magnitude of

the equipment. I show you this slide because I wanted you to see the surface of the asphalt. The contractor has a batch plant situated just on the south side of the Green River, a batch plant is not really the proper word for it. In the old days you called them a batch plant, but it's a continuous batching. It's a continuous operation plant today. It has a microprocessor and computer controlled, and it turns out a very, very good product. As you can see, it lays very smooth. The new equipment puts down a good surface. On the first stretch of road that we're going to travel over, just south of Naples, this particular contractor has taken tar sand, blended it, and run it through this plant and laid it in the place of bituminous asphalt, and it has got us very excited about the possibilities of tar sands.

Then we get out on the site, this is a slide of the mine services building, site work going on. This is almost completed now and it gives you some idea of the magnitude of the earth that we're moving to get the areas ready for construction. Just above the car in this photo is where the production decline portal will be. (That road is dry?) Absolutely. When we are on site we will have this excavated, it's been line drilled and ready for the decline contractor to turn under and get busy. The red pickup in the background is directly in line with the pipe sticking

out of the ground there which was the cap of the ventilation shaft borehole. This cap, of course, by now we've flooded the hole and there's been a lot of earthwork done in this area and we'll get brought up to date just after lunch. You see the country is fairly rugged. We are building roads in here. I've been advised that this morning the roads are all in good shape and we're going to look after you in the proper manner. Thank you very much.

MR. PRATT: I want you to know we're still on time and lunch is going to be served at 12 o'clock on site. I understand, Hank, that you'll have the buses out here in time to have a coffee break and everything beforehand, but we are really looking forward to having all of you out there on site, besides the bus that I know that you have, Hank, but we have extra vehicles if there's not enough room on the bus.

MR. ASH: If everything works according to clockwork, I'll take the credit, otherwise Elanor is the one that set all this up and arranged for the bus. Bob, I think there are a few questions. I think we've got enough time for more.

MR. PRATT: Good, we'll be happy to entertain any questions.

MR. HANSEN: That bridge site you showed us, is that on the White River and is that upstream from the damsite or will it cross the reservoir?

MR. PRATT: Yes, it is on the White River. It is upstream of where the dam will be. It's about halfway, in the middle of the reservoir. The bridge will go over the reservoir. Bob, did you have a question?

MR. LEOPOLD: The process that is being used for the paving, the asphalt, do they have a base under it, 8 or 10 inches?

MR. PRATT: The asphalt is put on a base course, a gravel base course. It is tacked with an "MC" oil and laid in two 3-inch lifts. We lay it in 3-inch lifts and compact it to 2-1/2 and gives us a final 5 inches of asphalt.

MR. LEOPOLD: Have you thought about using that for the full thickness, considering the availability of tar sands?

MR. GOFF: We haven't, no, but it is something to give consideration to.

MR. PRATT: Bob's second question was have we considered putting a full base asphalt on what would be, would you say about 12 to 15 inches based on availability of asphalt. You know the pit that we have here in Vernal and it is right at the edge of town, the tar sands, it belongs to Sohio and Sohio has had a long-term lease with the county, Rees, how long would you say that lease has been going on? (more than 20 years). So as you are riding out on the bus today you'll notice that Uintah County in the vicinity of Vernal has probably more of their roads paved than any place in the country, and all of it has come from the tar sands pit just at the edge of town.

MR. WATSON: What about the structural integrity of tar sands, is it comparable to asphalt?

MR. PRATT: From a structural standpoint it is equal and we have found it, as Jim has just mentioned, what they've done here in town in mixing it, it appears that it's going to be even more so. One of the problems that they've had heretofore, and Chuck, you correct me if I'm wrong, is that they have done really very rudimentary methods of covering the roads. They just brought it out, as I understand it, dug it out of the pit, bladed it back and forth and brought it out by trucks, laid it down and rolled it, and the big hunks they have taken off the side and cleaned up, so you see what we've been doing, the contractor in laying the present road, he's taken it into his batch plant, mixed it, heated it, where heretofore it hasn't even been heated, it's just been out and cold rolled on the road, so it's really been a very innovative process that they've used as Chuck said for over the last 20 years, to oil these roads in the county and the city.

MR. FERRARO: Do you anticipate between Phase 1 and Phase 2 a full corporation review to decide whether you move on, or is that just a constant process?

MR. PRATT: There's a constant review as we move throughout the project. When we have a feasibility study, we're making it of the mine right now, we're going to take a look at that, as we watch Union. As you know, we have a license with Union to use their process on site. We're going to be watching it very closely, we're going to make another review as Union gets into their project in about half a year, so it's going to be a constant review as we move forward, and that's why we're taking it in phases.

MR. UTTER: I was just wondering who your construction contractor was?

MR. PRATT: Parsons is the general contractor and Lays has been the road contractor and we're just now in the process of making the decision on who is going to be the shaft and decline contractor and that will be made next week. Bob Woody.

MR. WOODY: (Audience) Bob, is there a possibility with a current scenario of flat oil prices now that this project might say now well now this is it, we're not going to go forward do you have something like that in your review process?

MR. PRATT: Well in our review process we're not saying that we're really looking at flat oil prices. I guess you would say - you may have watched it on TV the Department of Energy Edwards this morning, as he was talking, they expect a level oil price for several years but over a longer period of time they see an escalation of oil prices that will probably be equal to or a little bit below the inflation rate, this is quoting Secretary Edwards, but as we're looking at it and as what we see ahead is that there's plenty of room for us to move providing we can get the technology to work. Our big question still today is not necessarily one of economics, it's one of technology and technology being particularly in the retorts and get a retort proven.

MR. DONNELL: Well presumably the technology will be pretty much proven at least the Union technology in a little over a year from now, because they expect to be in full production of this 10,000 barrel a day operation at the Union site in Colorado. You are banking on this, are you?

MR. PRATT: Yes, that's our No. 1 choice that we're looking at, which is slightly different than in our DDP, and this is one of the reasons we feel so strongly

about the success of this project, is that we are taking it a step at a time, we're watching somebody else's technology who is going into proven stage as you indicated, we will have six people on site there working as operating supervisors along with Union, so we're going to have people right there on site working with them, as we go. So we're looking yes, a year from today that hopefully we can move towards our detailed engineering to bring it here on site so that we can go ahead with our schedule. As a secondary or fall-back position we are still continuing, as we have indicated in our DDP work on the circular grate. We are continuing our pilot plant tests with Dravo, and that is still continuing, so we do have a fallback position should something happen to the Union process. We don't anticipate that it will. Very good, Hank, thanks.

MR. WATSON: Is 1987 the target date for your 10,000 barrels per day?

MR. PRATT: Well, we're looking at more than 16,000. Union is 10,000.

MR. WATSON: You don't have to answer this, but do you have an identifiable market?

MR. PRATT: Well, you know our oil goes to three companies that we're going to be producing here, so Sun, Phillips, and Sohio will all have their markets and they will be taking the oil basically at the fence line, the White River Shale Oil is the operating and management company, they take it over at the gate and they move it on, but as to your question, knowing the three companies, yes they do.

MR. ASH: Thank you Bob, and the White River staff. Before we break, I want to make a couple of announcements. One thing on the tour, if we have obtained the larger of the available buses, it appears that there is room for the Panel, the White River staff and the MMS staff, we can essentially all fit into that bus. White River has graciously invited our guests to go along on this tour, but I would like to set some ground rules. I would like to keep the first couple of rows in the bus open for MMS, for Eric and some of the White River staff who will be talking to us as we go out. Then I'd like to seat primarily the Panel members, which is what this tour is for, in essentially the middle section of the bus, and perhaps we can intersperse some of the White River staff back there through the bus so they can answer questions. But it does appear that we will have room for our visitors here, and I appreciate their being able to go along. I know there is a lot of interest in seeing what you've done, Bob, and we appreciate all you're doing for this tour.

Then we'll break and have time for everybody to get coffee, make a comfort stop, or whatever, before we board the bus. We would like to have that bus move out of here promptly at 11 o'clock, will that give us time to get out there? (Yes.) Okay.

This evening, for the get-together out at the Country Club, White River has arranged to have a bus available to transport us out there, it's a little ways out of town. It doesn't preclude anyone from taking their own car, but we propose to have that bus available over here in front of the Antlers Motel at about 6:15 to take people out there, and if there are no other announcements, or any housekeeping things that need to be taken care of, we will now break for coffee and board that bus before long so that we can move promptly at 11.

We will recess for that field trip - coffee break and field tour now.

Meeting recesses at 10:40 a.m.

WEDNESDAY MORNING, SEPTEMBER 29, 1982, SESSION

Meeting called to order by Mr. Ash at 8:45 a.m.

MR. ASH: I'd like to reconvene this thirty-sixth meeting of the Oil Shale Advisory Panel and I want to begin by expressing our thanks and giving some recognition to Mr. Bowden of the Elks Club, I'd like to express our thanks to the Elks in Vernal for letting us use their room for the meeting and for the availability of refreshments. Thank you very much. I'm glad you came in, you came at an opportune time.

We've got a couple more Panel members that came in since last evening. Mark Bubrisky of Rio Blanco County, Colorado, and Jim Bradley from Utah State. I'll recognize them again when they get here I guess. Again I want to express our thanks to White River Shale Project, for the field tour and for the great hospitality, that was probably the best field lunch I've ever had in all my career. Thank you. I'd like to also thank Dave Moore for assistance in arrangements here and for setting up our tour of the powerplant, which turned out very well, even though the original guide wasn't there. I wanted to mention a bit of sad news for some of you who haven't heard of it, a gentleman that used to be with the Oil Shale Office in Grand Junction, Ed Sandell, who transferred to Albuquerque a little over two years ago, passed away in July after several heart attacks and some heart surgery. Many of you I think remember Ed, he was a close associate while he was there in the Oil Shale Office.

With that we will go to the agenda for the second day, Wednesday morning, the first item of which is a continuing review of the prototype projects, and we'll be talking about White River's modification to their plan. We will turn to Eric Hoffman for introduction of this part of the program. Eric.

MR. HOFFMAN: Thank you, Hank. We'll be taking up the discussion of the proposed modifications to the Detailed Development Plan for Tracts U-a and U-b. Probably the best place to start would be to turn it over to Jim Godlove and his people and let them make their presentation and then for the Panel to comment with the Oil Shale Office and the lessee answering questions as best we can at this time.

MR. GODLOVE: Thank you, Eric. White River's presentation this morning is going to be divided into two sections. First of all I'm going to give you a brief introduction touching on the items that are included in this modification to the Detailed Development Plan. It will be a very brief introduction. Then I'm going to turn it over to Lowell Paige, who is White River's Mining Manager to go into much greater detail about our mine development related changes to the Detailed Development Plan.

I am sure as many of you know, White River submitted a Detailed Development Plan for review and approval in September of 1981. That plan was subsequently approved in early March of this year. During the intervening period of time White River has been in detailed engineering principally related to the mine development plans of the project and that's what we're here to discuss today, the revisions which are necessary in the Detailed Development Plan as they relate to our mine

development plan. The revisions to the Detailed Development Plan were put together into a document and submitted to the Oil Shale Office approximately one month ago. This document has also been distributed to each of the Panel members. Hopefully you'll have all had time to review this plan before the meeting today. I'd like to emphasize at the outset that White River's scope of work has not changed. We're still looking at a room-and-pillar mining operation, Phase 1 developing to 30,000 tons per day, subsequently increasing up to 176,000 tons per day. The project is planned to develop in a phased manner, that has always been our plan. We're looking at installing two demonstration retorts and upgrading the product during the Phase 1 producing about 16,000 barrels per day. The process shale will, as in the approved plan, need to be disposed in a side canyon to Southam Canyon, during Phase 1 and then progressing out into the main body of the canyon as we move into Phases 2 and 3. I'd like to emphasize that the overall scope of work of the project is still the same. It is just the details of our mine development activities that have had some degree of modification which we are here to discuss today.

Briefly now I'd just like to run through the major changes that are involved in this DDP revision. Seven of them are listed on this slide. First of all we have the project schedule. As I'll emphasize throughout this presentation, the revisions to the DDP are strictly mine-related. They really do not relate to the surface facilities construction to any great degree or to Phase 2 or Phase 3 of the project. As far as the schedule goes, the Detailed Development Plan, our schedule showed the mine to be on the critical path. We were going to be developing a 30,000-ton per day mine in 50 months. In reviewing that we found out that that probably was just not possible to do, so basically we have revised the schedule and have taken the mine off of the critical path. The schedule revisions I think involve the realities of oil shale development in these days. There's been a great deal of thought given to developing retort technology and this is of course consistent with our revisions to the schedule. The schedule basically involves a 2-year delay in the operation of the project, moving from mid 1986 to mid 1988. The main reason for the delay involves White River's continuing investigation of appropriate surface retorting technology. We feel the path we are on right now is very appropriate for the project. It is a very technological means of developing an oil shale process in these days and times. As far as mine development, there has been, I guess, if any area of the project that has been revised most significantly it is in the area of mine development. Our surface facility arrangement has been modified to some degree. Our means of accessing the ore body has been revised, and all of these will be discussed in more detail by Lowell Paige in just a minute. As far as the layout of the surface and mining facilities, those two have been modified somewhat. Again, we are only looking at the mine development related layout changes. We are really not here today to discuss any additional changes that may be required down the road for our surface processing facilities. The primary reason for revising the layout was to develop a more efficient means of handling the product and producing shale oil. Basically what we've done is we've consolidated all of the Phase 1 facilities into the smallest possible area. I'm sure if you would refer back to the original Detailed Development Plan the Phase 1 process facilities were spread out quite widely within the plant canyon and now we're consolidating them into a tighter spacing. also relocated the fines storage area and the raw shale storage area. We have

relocated the runoff retention dam and I'll be discussing that in just a minute. The overall disturbance during this mine development phase of the project, that is between now and 1986, would be about 110 acres. The total Phase 1 disturbance is planned to be 635 acres now. That's after the surface facilities are in operation and the full Phase 1 pile has been developed.

As far as White River's retort plan is concerned, I'm sure you remember White River's Detailed Development Plan for Phase 1 showed a combination of one Union and one Superior circular grate retort. We have revised that retorting plan somewhat. We are now looking at two Union retorts during Phase 1, as opposed to a combination of the two retorts. White River, as I'm sure most of you know, has obtained a license with Union that allows us to follow the development of that project very closely, to actually place operating personnel within the Colorado facility, and to obtain all the information that that facility will be developing. We think that will give us a very good opportunity for success as we move ahead in Phase 1, because there will already be an operating plant which we will use as a model for our project. Of course White River is continuing to investigate circular grate technology and we are at this time conducting pot grade and pilot plant studies on circular grate technology, and those will continue.

In the area of processed shale disposal, this modification to the Detailed Development Plan really involves very few, if any, modifications to our overall disposal plan. We are still planning to use the water harvesting approach to processed shale reclamation. We have taken a somewhat more conservative approach though in the placement of processed shale. The original Detailed Development Plan if we had followed it exactly could have brought processed shale over the top of the ridge line of Southam Canyon. We subsequently have modified that to bring it down below the top of the ridge line. That of course has increased the total acreage involved in the Phase 1 processed shale disposal pile, but this will not change White River's total disturbance plans, because basically we're just moving out into the areas that we would have moved into during Phase 2 and Phase 3.

As far as the runoff pond goes, the runoff retention dam, that is, White River's plan all along has been to contain all of the surface discharges from the plant area, as a result of the 100-year historical flow. That is still White River's plan. However, we have relocated the runoff retention dam slightly down gradient of the location that was shown in the Detailed Development Plan. This will involve a dam that's constructed primarily on Tract U-a but a certain part of the dam itself and part of the retention pond would be located off tract on BLM land, Section 15 north of Tract U-a. We have prepared an environmental assessment and submitted a right-of-way application to the BLM which is being processed at this time for that off-tract development.

Another change in the design of the runoff retention pond, the Detailed Development Plan, we were looking at lining that pond, in order to achieve a zero discharge. We are now as a result of some detailed geological investigations of the dam and the pond area, we're now looking at installing a clay core lining within the dam itself and a grout curtain beneath the dam to control surface flow and leachate as opposed to installing a liner in the pond itself. Of course as a part of this, White River is going to be proposing a fairly elaborate monitoring program in order to detect any leakage that may occur.

Finally in the area of reclamation, here again there have been very few changes in this. Basically what we've done in this modification to the Detailed Development Plan is to provide the Panel and the Oil Shale Office much greater detail as to how White River plans to go about recovering top soil, storing top soil, and proceeding with the regetation of disturbed areas on tract. The one other thing in the reclamation plan in our water harvesting approach, the Detailed Development Plan showed a rectangular shaped top soil trench, which would be dug into the processed shale. Because of operational problems and because of the success that we've seen over at Anvil Points, we're now looking at a V-shaped trench instead of a rectangular trench. That's probably the most significant change in our reclamation plan. That part of the plan is undergoing continuing investigation at this time.

What I'd like to do now is turn the microphone over to Lowell Paige, and then after his presentation we will be glad to entertain any questions.

MR. PAIGE: Okay. Thank you, Jim. It's a pleasure to be here with the Panel again. What I really want to do is go quickly through some of our mine plan changes and some of them, part of the plans that have not changed, I'd like to explain what changes we've made and as a preface to that I think we want to keep in mind that the changes that you see happening at White River from the original DDP are really logical evolution as we go into the more detailed design, engineering, and construction of our project, and we're obviously looking at operating efficiencies and costs as we put the project together. The overall goals are the same, our schedule has changed a little bit for various reasons, but as we design it and we build it there will be constant changes from the original plan, and I think we all recognize that. What we are going to look at this morning are some of those at this particular stage. They are all mine-oriented because we are focusing the project now purely on the development of the mine.

To start out with, we'll look at an overall plan of the plant mine area. The top of the map is to the east and north is to the left. The spent shale area for Phase 1 is to the right, in the orange and just to the left of that in the pink is the fines disposal area. When we were out there yesterday those two areas were back behind the hill where they're working on the foundations for the new building. The building pad that you were looking at is in this area, and the shafts are right along in here. I missed the lunch yesterday, we worked through the lunch so we are glad you all had a good one, but we were interviewing some shaft contractors and so we were sorry to miss the tour. Now this is our Phase 1 construction facility, this is the raw ore stockpile, 400,000 tons, that's referred to in the DDP. And the mine area that you looked at where we were building pads and leveling out are in this area and where you saw the blast I believe was right up here at the shaft area. This facility is the retort and the upgrading and the processing area that will be built later on. It is all confined to the south, which is in that direction, to the right, of a ridge, and it is easier to stand out in the field and arm wave to describe this, but there is a ridge of that runs right through here and our entire facility will be to the south of that, leaving the north area, and this is where the paved road ended and you came on the new road, the gravel road on up to the top where the shafts are, the pavement ended here. This area is where we will locate the commercial facility, or Phase 2 and 3. So we have consolidated and reduced the spread out in the Phase 1 portion of the project, but the overall is still in the same general area.

This is the tank farm that will be part of the initial facility and we would just expand as we got into a larger facility and the runoff retention dam and pond are down in this area.

When we focus in just on the mining area now, since that's what we're working on, here is the building, and the yellow is the pad that was leveled out, just on top of it is where the water treatment facility will go, and we'll bring the water up from the river from alluvial wells into a raw water tank, we'll treat the water to make it potable and have a potable water treatment tank and then it will be piped in the normal distribution system into the building and other areas as required. We'll also have a fire line, hydrants and systems and all those kinds of things, and they're under construction. Those bids have been let and the work is proceeding in those areas. Just to the left and below that building, and this little arm of yellow is where the sewage treatment plant goes and that will be a complete treatment system and the effluent from that system goes into a separate pond which is the orange right next to it. That does not drain to the main runoff area. The large rectangular yellow area is the shaft pad area, where the two shafts are located and again I believe you saw the shot yesterday. The orange here is the stockpile.

Now we had in our original plan a production shaft and a service shaft, and in looking at this in more detail we looked at the reliability of hoisting this rock for 25 or 30 years in a shaft hoisting system versus a conveyor system. We have always planned, as you remember in the DDP, reference to a decline into U-a and U-b for Phase 2 and Phase 3. We had not planned to do it initially in Phase 1 because it appeared to us in the earlier years of putting the DDP and our feasibility studies together to be very expensive and time-consuming for the construction of it, and so we had leaned toward a shaft for the production of Phase 1. Now when we finalized on a two-retort Phase 1 rather than a one-retort Phase 1, that of course doubled the production to roughly 30,000 tons, and then as we did some detailed engineering on the production shaft, and we did some costing on it, it appeared to be extremely expensive. So we did a cost estimate on a decline, and we compared the two, we looked at the reliability and in putting it all together we felt that a decline for Phase 1 was warranted. We reviewed that amongst White River and other people and we felt that that would be our direction. So that is what we're proceeding with. We have taken the production shaft out of our program and substituted a decline which is these two green lines you see on the plan, where we will start out at the surface and I think you saw where the portal will begin, in the side of the hill, and we'll drift down at about 13 degrees for some little over 2,000 feet, getting to a dogleg, a turn in it, and then we will continue on down at about 15 degrees to the mining interval, the ore zone, back near the service shaft. We had the option, of course, of going straight on the decline all the way to the bottom or making the dog-leg. The dog-leg itself is not an advantage operationally; however, the advantage to us by putting a dogleg in was to bring the bottom of the decline in the general vicinity of the service shaft and in the general vicinity of the over-all plant area, where we want to do the initial mine development and get started with the mining so that we're not scattered out with a service shaft here and a mile away the bottom of the decline. So we put in a dogleg. Now this upper leg of the decline is 28 feet wide and it's going to be 12 feet high, and the bottom leg is 18 feet wide. The

reason we have 10 more feet in the upper leg is that for Phase 2, for our commercial facility, and this is consistent with the DDP, we will continue this upper leg on in a straight line direction into the centroid of U-b to access the ore body, and we have room in that now with this extra 10 feet to put in a second conveyor. We'll have a 48-inch conveyor for Phase 1 coming from the bottom up the 18-foot-wide lower leg of the decline, transferring to the conveyor up one side of the 28-foot upper leg. Now when we get to Phase 2 we can add a larger conveyor, let's arbitrarily say a 72-inch conveyor on the other side of the upper leg of the decline and we can extend that decline on into U-b and we have our production facility for Phase 2. So I think you can recognize that as we go into expansion and commercialization of our project this will be a decided advantage, it's a little more money today but it will pay off later on, and so with the conveyor haulage, which is much more reliable than a hoisting system we are quite confident that at 30,000 tons a day we can operate a relatively efficient mine, and of course that's the name of the game. So our major change is the decline for production in Phase 1 rather than the shaft. Now the shaft itself, the hole in the ground, will still be dug. We will have two shafts up here in the shaft area, one will be a 30-foot-diameter ventilation shaft, which is what we are going to construct starting next month, and the decline. So our present shaft decline construction package which we are bidding. Well we have the bids now and we are reviewing those and selecting a shaft contractor, which we hope to be able to name next week and he should be in the field within 2 weeks starting to work. The package that he will do will be this one ventilation shaft and the complete decline with the dogleg. Later on, in '86 when we go to the surface construction of the retort and the processing facilities, we will sink a second shaft about 250 feet away from the ventilation shaft, which will be our service shaft, we'll have a headframe on it and a hoist and we will use this for men and materials, and it will be adequate, it will also be 30 feet, and will have adequate capacity to satisfy our underground servicing requirements through Phase 1 and Phase 2. So what you're seeing White River do here is obviously not just build for Phase 1. We're building parts of our facilities for Phase 2 commercialization.

There'll be a third shaft, and it's going to be located about in here. It will be up on a ridge behind the plant area, and that will be an exhaust shaft. We feel we need about 3 million cubic feet of air a minute to ventilate this mine in the Phase 1 operation. We will have three 1 million cfm fans on that exhaust shaft pulling air out of the mine. We'll have a negative pressure mine in the sense that we'll be sucking out of the mine rather than pushing air into it. We're doing that because of the methane that we know exists down there and this is a much better ventilating system than a positive pressure system. So the air will come down the ventilation shaft that we're going to build now, it will circulate through the mine and it will come up through the exhaust shaft. We will also bring some air down the service shaft, that air will have to be heated because it will have a lot of utility lines and of course men and materials in that shaft, and that split of air will ventilate our underground maintenance facilities and then we will discharge up through the decline giving us an exhaust system up through the decline and exhausting at the portal.

Now when we look a little more at the mine development itself, we see the portal and the upper leg of the decline coming on down with the dog-leg and then on down actually through the mining zone to just below it. We will have the two shafts and this does represent the surface stockpile. Now it's the shaft on the left, the

ventilation shaft we'll be building now, the decline, and those two will be connected, that is in the contract. You can see that the dog-leg is above the Birdsnest aquifer. We're not aware of any significant water above the Birdsnest nor below it, and when we sink the shaft and drive the decline we will grout the aquifer off and sink through them. We do not intend to, if we can technically grout this and seal the water, we do not intend to make water in the shaft or the decline. We want them relatively dry.

Now we're working our way underground, and here the blue coming down is the bottom of the ventilation shaft, and it defines what we are going to do in this sinking contract that we're working on now. The contractor will drive some stations on each side of that shaft and then he will drive a ramp that's in the blue and circles around underneath the future mine workings and connects to the bottom of the decline which is the green line coming down from the right. Now that is our present construction contract. When we go beyond that now, our operating mode in the mine will be to develop the mine workings that you see in this immediate area and the service shaft is this one to the right of the ventilation shaft, and our maintenance facilities, shops and everything, will be along in this area, and so that men and materials can come on down the shaft and move straight into the maintenance area where of course we'll have a significant portion of our manpower and we'll have our warehousing and everything there, and that's a rather fixed facility. The miners will move on in their vehicles down the other entry and on out to the various panels, the working faces where they're working. Now the other green that's shown on here is how we're going to handle the ore after we mine it. The ore will be mined in a bench system just as we described in the DDP. We will haul it, at the present time we're estimating using a front-end loader and trucks to move the ore to a primary crusher, a truck dump and primary crusher facility right here. We will crush the ore to 12 or 10-inch size into a thousand-ton bin and the bin will discharge to a conveyor belt which will bring the ore up to a secondary crusher facility where we'll crush the ore to the top size required by the retort, and that's going to be somewhere between 2 and 3 inches. We will discharge, there'll be two secondary crushers, we'll discharge to a thousand-ton bin which will then feed to the decline conveyor. The conveyor will of course bring the ore up, transfer it at the dog-leg and then on up to the surface. At the surface the ore will go to a 10,000-ton bin, a concrete bin, and that bin will discharge to a screening plant where we will screen out the fines and make whatever cut the retort feed system requires. In a Union retort, which we're presently anticipating having, would be a 2 by 1/8-inch material so the -1/8 would go to fines storage, the 2 by 1/8 would go to the retort feed. Now also out of that bin we can take ore to the surface stockpile. We will have a 400,000-ton stockpile which will provide feed to the plant system at any time that the mine is not operating or we have some problems and can't get ore out. So that we're trying to decouple of course the mining operation from the plant operation. If the plant's down, we don't want to shut the mine down. We want people to continue to work so the ore would go into the bin and then over to the stockpile. Obviously that can only last so long, but hopefully our down periods won't be extensive. The stockpile will reclaim from below it back to the bin, so we can recycle ore in and out of the stockpile, in and out of the bin, and out of the mine. So our future development will include this shaft area development and then we'll look at a plan that starts down to the mine in the panel area. Now here at this point is where

the ventilation shaft comes in and just above it is where the service shaft will come in, and we're looking straight down on the mine now, and this red arch is that ramp that connects to the bottom of the decline, the red down here is the conveyor designation and the primary truck dump area. Now the yellow strip is the primary maintenance shop, the blue is where the warehouse will be. Again this is purely for the underground facility. On the surface we'll have shops and warehouses there also, and that will be located at this building that you saw us working on the foundation. But for underground our intent here is that all of our maintenance for the underground will be in the underground, although we won't rebuild engines and things like that. We'll replace components, and so the development will go to the south. Again this is consistent with the DDP and then we'll develop entry systems to the east and west towards panels for primary production, and again consistent with the DDP we are going to go on to the east and we'll take a look at the overall plan here for a couple of panels. Again here is the service shaft area and the decline and the loop underneath it, and the main entry system going off to the east. Again we're going that direction for a lot of reasons. One is that U-b is a little bit shallower, we're a little up-dip, there's less gas, this is all based on our core drilling. We think conditions will be a little bit more favorable there than on to the west, which is deeper, seems to be more gassy, and and this is consistent with leaching, when we get out here we'll then drift to the north and be in a position to intercept the extension of the decline, the upper leg of that decline into U-b, so that we're all working toward this common goal of getting commercial on this thing.

Now the first panel will be this red area, and the second will be to the right of it and the blue in the middle and this blue line along here designates our primary exhaust system for the ventilation. The air I said would come down the ventilation shaft. It's pulled down by the air being sucked up the exhaust shaft. One of the first things we'll do as we develop around this shaft area will be to drive this entry out and these entries down to that exhaust shaft. We can't get into major production until we have the exhaust shaft in operation. The shaft itself isn't the problem. it's going to take us time to drive these drifts out and connect with it. So we'll be driving that out early in our development and working in this dark green area. Then the light yellow will be development work mining as it goes and opens up the development entries for access to the various panels. The panels are about 11 - this doesn't designate it exactly right, but it's about 11 rooms wide. It's about 2,000, 2500 feet long, and about 1500 feet wide, and we really feel at this point that would be the dimensions and it's based on a ventilation requirement, how much air we think we need to maintain some criteria that we've set, one of those being we want the air velocity to move at least 100 feet a minute so that we don't have stagnant pockets and things like that, and when you get these large areas opened up it just takes so much air to keep it moving and so much horsepower that you have to cut these panels off at some point and then move to another one. So this is our plan and again this part is pretty consistent with the DDP. It's the decline, it's the ventilation system, that's somewhat different.

Now this is an artistic sketch of the mining panel or a face where we're benching. We will be drilling and blasting on the upper bench about 25 feet high. We will do our rock bolting and everything at that level. We will then follow along in

the panel with the lower bench, taking out the lower 30 feet or so, and the ore coming back and over to the dump. Now as the panels move away from the shaft we will move our primary crusher out along those entryways and so we don't have such a long haul with the trucks, and we will then take the ore from that moved or new primary crusher location over to the secondary crusher facility by conveyor. We have the option, of course, to eliminate the trucks and use conveyors all the way, and load haul dump units in the panels. We can go either way and over the next couple of years while we're driving the decline and shafts we are going to take a hard look at which haulage system we want to go with.

Schedulewise, this is difficult to read, I can't read it from here, but I think I know it fairly well. I would review with you right now a little bit more than just the mine. You saw the grading work going on, and that's nice compared to where we've been and we're pretty excited, of course, getting it started, but we've got a lot of the facilities between now and next summer that are going to go in, and roughly the schedule is this. The building that you saw being worked on is to be complete by the end of February, and we call it the mine services building. It will be the center section of our overall surface maintenance facility when we add wings to it in the '86-87 time frame. We'll use it now for warehousing and for our office space. It will have some change rooms in it and the back half will be a large warehouse, the front half will be offices. It will have oil heat and air conditioning in the whole facility. It is a permanent facility, but will be expanded. That building, incidentally, that's going up now, the piece we're putting up now is 27,300 square feet. Just along side it will be the water treatment facility, there will ultimately be a pipeline up from the river but now we're going to truck the water up from the alluvial wells to the tanks and treat it and then put it in as it will be just the regular potable water system. It will be a pump pressure system rather than a high tower gravity system. There will be fire lines, with fire hydrants around the building and along the roads and these will be extended out and then will grow as the plant grows. The sewage treatment plant will be a complete treatment facility and the water, the effluent from that plant, will be usable for dust control and things like that. It's not a lagoon system. We are also building the switchgear and the main substation for power. We've authorized Moon Lake to start engineering on the main powerline to come in, which should be complete by July 1 of '83. We have the switchgear equipment on order. Moon Lake will start constructing the line in the spring. They are going to engineer it and acquire materials this winter. In the meantime we're going to upgrade the powerline that comes in now to that A-6 air monitoring station that you saw alongside the road, which is now just a single-phase line. We are going to make a three-phase line and bring in 13,200-kV power and then we have let a contract now for the pole line distribution around the mine area and we will pick up that power at the air station with our pole system, this is a permanent system. We'll place the line over to the mine area, we'll feed the building, we'll take a stub line down to the water wells to feed the alluvial wells and we'll have drop lines for power and floodlights and things around the facility and also the guard shack that will go in and things like that. We'll have power for the shaft contractor and for these other guys and this temporary power is scheduled to be complete in November, so by December 1 we hope to have line power up to the mine area, and the poles and things that we're going to put

in will be part of the permanent facility even though we call it temporary power. The power is temporary in the sense we're getting it in a temporary way from Moon Lake, the permanent system will be in, as I said earlier, in July. The shaft area, the contractor which we hope to select this week or next will be in the field in roughly two weeks of award of the contract. Right now it appears that we bid the job to complete by the end of 1984, which would then allow us the year of '85 to do some test work underground and prepare for the major construction in '86. The contractors, we went out to six major contractors, almost all of them came back with an earlier completion schedule and the ones we seem to be zeroing in on now appear to plan to complete the job in either June or August of 1984, so we should have access to the ore body two years from now.

The grading work that you see going on now is scheduled to complete by the end of the year. The only thing that would remain in the sense of dirt work will be the construction of the water retention dam. That has not been bid yet, but design of it is complete, we're doing some review on it. We have sent the plans to the Oil Shale Office and the State Engineer and others to start reviewing and we're working on the permitting of that dam. We hope to bid it shortly and to get part of the construction in this fall. We don't plan to actually put in any of the compaction or the fill on the dam until next year because we don't think we can get good compaction in the wintertime. However, we can do the excavation, we can do the grout curtain and things like that in cold weather, and so we're going to try hard to do that so we have the dam completed earlier in '83. So that is the only piece of dirt work that really hasn't been let. The rest should be all finished, including the new road down to the water wells and all the site work that is going on now. The road, which hasn't started yet, out to the nonhazardous waste disposal, I guess is the terminology, it's a trash dump to me will be in this fall and the trash dump will be operational and the powder magazine will be out in that vicinity. Those are all in the area of the Phase 1 spent shale disposal area, and they are on the plans.

I think with that I'll close and we'll entertain any questions that anybody has.

MR. ASH: Thank you for an excellent presentation, White River. White River is prepared to entertain questions from us, and we really plan, as in the past, to utilize our workgroup structure for this review, so I'll turn this over to Wally Hansen, who is Chairman of our Workgroup for U-a U-b.

MR. HANSEN: Thank you, Hank. Let's elicit questions from the workgroups in the order in which they appear on the agenda, starting with the Socio-economic Group. Are there some comments with regard to the modification?

MR. HANSEN: Are there any comments from the Panel at large with regard to socio-economics?

MR. ASH: I didn't catch it, but are there changes in your employment projections, etc., in here that are significantly different than what we've looked at before?

MR. GODLOVE: Hank, basically the changes in employment have to do with scheduling, at this period of time. What we're looking at is a maximum of 150 to 200 people on tract in the mine development phase of Phase 1, that's between the present time through calendar year 1985. Basically there's been no change in White River's ultimate employment estimate. For Phase 1, ultimate construction, we're looking at about 1700, 1500 to 1700 people, that peak would be moved from the '84-85 time period in the DDP to the '87 time period now. Of course the ultimate employment on tract we're still looking at about 5,000 people ultimate employment for construction and operation and then the full Phase 3 operation, about 3300 people. Basically the only change there is moving it 2 years and reducing the total employment during about the next 2-1/2 to 3 years. Lowell just mentioned to me, we're just in the process now of getting the bids for the shaft-sinking operation, and it looks like that employment is going to be about 110 people for shaft-sinking. We may have to revise our estimate but that's a constant thing. It looks like we're in the ball park with our estimates of 150 to 200 people.

MR. HANSEN: Then can we go on to the Transportation Group?

MR. LOWELL MADSEN: It doesn't appear to me that any of these things really modify the transportation system.

MR. HANSEN: Okay. Does anyone else have any comments in that regard? Is there anybody here to speak for Deborah Linke on the Water Supply and Quality Panel, or does any member of that panel have any comments to make?

MR. DONNELL: Not particularly with water supply, but I'm interested in the comment you made about when you intercept the Birdsnest Zone that you don't expect much water. Is this because the Birdsnest Zone has salines in place and you don't have the voids to contain the water, or there just isn't much water available in that sequence?

MR. PAIGE: I'm sorry, I may have left the wrong impression. There is water in the Birdsnest and we anticipate lots of water there. We do not anticipate making a lot of water in the shaft or decline because we plant to grout it. You are correct, if the salines were still there, then that would be an indication there wasn't much dissolution, but, no, we've not found salines in the core and we think that there are significant quantities although it's not under pressure, which is an advantage. We are planning to grout, we will have the capability of grouting both with chemical grout and cement slurry grout and our intent is to grout the formation and have relatively dry shafts and declines. Now that's an intent. You know how those go.

MR. LOWELL MADSEN: This may have been discussed earlier, or I may have forgotten, but will the White River Dam have any direct impact or create any water problems in the mine?

MR. PAIGE: We don't think so. We've looked at it very closely, we've spent a fair amount of time evaluating this question, and it's our studied opinion that

the mine will not see nor will the reservoir see the reflection of either one. We don't anticipate that we'll lose any ore reserves nor have to mine differently when we approach or are under the reservoir.

MR. HANSEN: Yesterday when we drove in the bus around to Southam Canyon for some distance the road rode on top of a ledge of marlstone that some of you may have seen out of the window. This doesn't crop out in the service area, but it dips below ground and it ought to appear at some shallow depth below the waste water storage reservoir, and the Oil Shale Office has expressed a little bit of concern about this that I really can't articulate, but I think the Panel ought to know about it, and I'd like to ask Glen Miller if he would comment briefly on their feelings about this.

MR. MILLER: The marlstone that you mentioned is about 20 feet thick. It was intercepted in many of the drillholes that were drilled around the plant site and especially around the dam site. Locally it seems to be highly permeable. I don't think the story is in completely on the extent of that permeability. We received an engineering report on the drilling just in Monday morning's mail so I haven't had a chance to look over the details of that. But in the field during drilling and White River's consultant has prepared a report that addressed this, there are places beneath the damsite that the marlstone appears to be highly permeable. They lost circulation during drilling, they did some permeability testing and obtained high values of permeability. Again, we haven't had a chance to evaluate the engineering report completely, but that is a matter of some concern in terms of leakage from, not the dam itself, not through the dam, they will grout that, but for the reservoir bottom.

MR. HANSEN: This would be through joints and fractures?

MR. MILLER: Oh, joints, fractures, the Uintah itself has some permeability. Our experience on Tract C-b, for example, with unlined ponds there in the Uintah, in very similar looking lithology, the documented leakage in those ponds has ranged from a high of say 2 or 3 hundred gallons per minute when the ponds were first constructed. This tends to level off to perhaps in the 50-gallon per minute range after the ponds have been used awhile and somewhat silted it in. The permeability is reduced at the bottom of the ponds. The engineering report does note that the design, that they recommend, for grouting, is designed to minimize leakage.

MR. HANSEN: Thanks, Glen. Does White River want to react to that comment at this time?

MR. PAIGE: I guess all we can say really at this point is that we have done an awful lot of soil and shallow drilling, soil work and shallow drilling in the plant area which includes the runoff retention pond area, and we think we're aware of the various concerns and are designing and acting accordingly. I don't really at the present time, and from the work - we sent Glen the report late so he couldn't comment on it at this meeting, of course.

MR. HANSEN: I didn't mean to catch you unawares.

MR. PAIGE: But it is a report by Woodward-Clyde that did this particular piece of work for us, and we don't really see this from all the work that's been done it to be a major problem.

MR. GODLOVE: I'd just like to add a couple of things to that. We've basically approached this from one point of view. All ponds leak. There is no such thing as an impermeable system, whether you line it or whether you grout it off, sooner or later something is going to leak. So the approach we've taken is to try to design a system that leaks the minimum amount of water, and as I've said, there've been five separate engineering evaluations within White River and its consultants, and they've all arrived at the same conclusion: That a clay core-lined dam and a grout curtain offers the best chance for whatever you might want to consider an impermeable system to be. So, No. 1, what we're trying to do is to design as close to an impermeable system as possible, recognizing that it is not possible. We are going to be proposing a fairly elaborate monitoring system that will detect whatever leakage occurs. We're going to be locating a number of monitoring wells downgrade from the pond along the leakage path in an effort to try to detect leakage, and then finally, each of our consultants has assured us, and our own investigations have assured us, that should leakage occur, that with this type of design we have the best chance of controlling it, minimizing it, correcting the leakage, if you will. We don't see that we have the same assurances with a lined pond, you know, where is it leaking? How do you go in and plug up a pond with a liner that's leaking? That's extremely difficult to do. So we feel we've designed a system that offers us the best chance of achieving an impermeable system. Of course only time will tell.

MR. HANSEN: As time goes on, there will be some siltation in the pond that would tend to seal up leakage also, isn't that true? (Yes). Glen.

MR. MILLER: I have briefly read the text of the engineering report last night. I haven't looked at the tables and the data, but the engineering report does comment on the monitoring, the ability to be able to monitor and see if the thing works, and see if there is anything unacceptable happening in the way of leakage and migration and so forth. So one of the things we'll be looking at in terms of approving the plan would be what is a sound monitoring program that would detect the leakage of material from the pond. The leakage path in fractured rock, trying to locate that or determine that is an exercise in uncertainty at the best. It will require some monitoring that is probably not usual in an ordinary pond.

MR. HANSEN: Does anyone on the Panel have any reaction, or would anyone on the Panel now like to speak further with regard to water supply and water quality? If not, we'll ask the Air Quality Group for comments. Are there none? The Wildlife group? Hal.

MR. BOEKER: Wallace, we have found that the revised DDP for the White River program does not seem to raise any significant fish and wildlife issues which have not been previously considered or analyzed. I guess there is one question that I would like to probe into, though, and that is the disposition of the eagle nest that is present in I think it is Section 33. I noticed that the spent shale disposal area will be enlarged and it seems like this particular eagle nest was within an area of disturbance even without the enlargement of that disposal area, and I guess I'd like to ask Jim if an orderly process has been arranged to handle that issue?

MR. GODLOVE: Okay. For the Phase 1 areas of disturbance, we don't impinge upon any raptor nests whatsoever during Phase 1. All of the disturbance takes place within the plant canyon and that side canyon of Southam Canyon. I'm sure as you know, we've done a fairly thorough evaluation of the raptors' nests on tract, and really extending beyond the mile perimeter of the tract. I believe the nest that you're specifically referring to is the Golden Eagle nest at the south end of Tract U-a. We do have a stipulation in the conditions of approval for the project right now that requires White River to basically stay away from those nests during the period of February through April of each year. We accepted that stipulation reluctantly, primarily because we don't feel that either of those two nests are what might be considered to be active at this time, but nevertheless, we do intend to stay away from those nests with any sort of activity that might be considered significant during that period of February through April, and for several years to come, which will basically give us the opportunity to continue to evaluate those nests. Now our long-range plans, as soon as the regulations are promulgated, which we understand, if they haven't already been they are about to be, that allow the taking of nests White River does intend to file an application to allow those nests to be officially taken, but at this time we don't have any plans of actually physically removing those nests, but what we would simply want permission to do is to have a more closer evaluation of the nests and see what sort of impact human development has on those nests as we proceed. That is a very important thing for White River, as we move into the commercial phases of the project, because if the same stipulation that we're under right now persisted into the commercial phases we would have some degree of problem down at the south end of Tract U-a and would result in tremendous inefficiencies in the disposal of processed shale. It basically eliminates about a full section of the southern tract of U-a for disposal, if we don't get those nests officially taken.

MR. BOEKER: We recognize that there are many instances where raptor nests have been found to stand in the way of development that has been committed, and there are arrangements being made where the resource can be protected under those kinds of situations. Now the amendment to the Bald Eagle Act that you're making reference to has already received legislative correction. We do have an amendment to the Act which permits the taking or removal of a nest. Now the regulations that you refer to are still in the process of being developed and we would hope by the time the program develops to the stage where you need that type of relief that we would have the regulations. Now if for some reason these regulations are still not developed that would provide you the authority to go in and remove that nest, there is another provision under the Act itself which provides for the scientific or experimental removal of young, the nesting pair, or the nest structures, that would be under a scientific experimental purpose, and I think that avenue would be available if the regulations that are being worked on now are not prepared for your application.

MR. GODLOVE: White River is a group of optimists. There are a number of challenges facing us and that is just one of them, but at this point in time it does look like the solutions are there for us when we need them. But we'll continue to evaluate all the alternatives that are available.

MR. BOEKER: Well that sounds very satisfactory, Wallace. I might ask any other members of the Fish and Wildlife Panel to comment if they have something to add.

Mary Anne, do you have anything? Andy Heard? Betty, would you like to comment on this area? I think that's really all we have, Wallace.

MR. HANSEN: Thanks, Hal. Then let's go on to Surface Disturbance and Rehabilitation and I think Carter has some comments.

MR. GIBBS: Some of our comments have already been answered in the presentation by White River. Our major questions, Jim, with the increased surface that you're going to have for rehabilitation in Southam Canyon, will you be recovering alluvium and soil-like materials from your retention dam area and Southam Canyon for that revegetation effort at a later date?

MR. GODLOVE: An unequivocal yes. It's been stressed and I think we recognize that there is only a minimum topsoil resource on tract, and I'll have to admit our topsoil recovery plans to date have almost gotten in the way of development, because we have tried to pay so much attention to them, and we've developed what we consider to be an excellent topsoil management plan based upon investigations of the areas and determination of exactly how much material is there, and to what depth it's going to be recovered and where it is going to be stockpiled. That same philosophy will move with the project as we get into Southam Canyon.

MR. GIBBS: I think as far as the rehabilitation is concerned, I guess the Panel recognizes that White River has an excellent research project that's been going on for some time in relation to rehabilitation so we think they are in pretty good shape. I would open it to comments from other members of the Panel. Betty?

DR. WILLARD: I think we were wondering this morning if you were thinking of saving any topsoil from the White River Reservoir area?

MR. GODLOVE: Betty, we have no intentions of getting involved in any way with the development of the White River Reservoir. Is that the reservoir you're talking about as opposed to our runoff pond? We feel that's a responsibility of the State of Utah and whatever the State of Utah is required to do, White River will eventually assist in funding through our purchase of the water. So at this period of time we don't plan to get heavily involved in any of the development activities related to the White River Dam. Now White River has indicated to the State that we are more than willing to participate in any sort of monitoring activities that are co-beneficial to the project, but we don't plan to remove topsoil from the dam area.

DR. WILLARD: Well we thought that if you have a need for more topsoil than you'll get from these other two sources, that maybe something very beneficial could be worked out between you and the State, because they are obviously not going to need it and it would be a great preservation of a resource.

MR. GODLOVE: I think that's an excellent suggestion, and we'll look into further. I think our plans are right now simply to restrict ourselves to the on-tract topsoil resources and simply use that as opposed to going off tract or in other areas for topsoil. But that's a good suggestion. We'll look into it further.

DR. WILLARD: And I'd like to ask Lowell, some other projects that I know about have used solar heating of intake air, and I wondered if you had looked at that yet.

MR. PAIGE: The answer is yes, we have, but not in a great deal of detail. We kind of eliminated it very quickly. The only air that we'll be heating for the mine will be that air going down the service shaft, the rest of it will be just whatever it is, we'll filter out the tumbleweeds and let the rest go. But the air down the service shaft is going to be something like maybe half a million cubic feet a minute and to have any effect on that with a solar system would kind of shadow the entire lease, which might cause other kinds of problems. So yes, but no, not really.

MR. GIBBS: Steve, did you want to make any comment? (no). Wally, I guess that's it.

MR. HANSEN: Jim, you mentioned the retention pond. Do you contemplate using the alluvium in the bottom of the retention pond as a source of topsoil?

MR. GODLOVE: Yes, we've identified approximately 100,000 yards of topsoil-like materials in the retention pond area. We are in the process right now of recovering that topsoil material and placing it into a long-term stockpile. The additional alluvium beneath the topsoil material we plan to use for engineering fill for the dam, the retention dam, and possibly other places on tract.

MR. HANSEN: Would that alluvium also have possibilities as a source of topsoil below the upper soil profile?

MR. GODLOVE: I guess I'm not following your question. We are going to be recovering the topsoil materials from the pond area, in addition to the dam area.

MR. HANSEN: Right. Just in that profile is there some alluvium beneath the upper few feet that would have suitability for use as soil, you see what I mean?

MR. GODLOVE: Not in our opinion. We feel, I think, in that area, it's about 3-1/2 feet, maybe 3-3/4 feet of what we would consider good growth medium, and that's all we plant to recover out of that area. Of course, there are materials below that but that we feel are not really suitable topsoil materials. I guess they could be used in a topsoil type plan (you're really in a bind). But at this period in time we do not plan to recover and stockpile that. We intend to use that for engineering fill, as necessary on tract. We feel that's the commitment we've made in the Detailed Development Plan. As it looks like right now, and this is contained within White River's Topsoil Management Plan, in the plant canyon area for those 110 acres that we are disturbing during the next 3 years, White River has I think about 165,000 cubic yards, within that 110 acres, that's total of excess topsoil materials. So we feel we are recovering a tremendous amount of topsoil and all of that 165,000 cubic yards will be placed into long-term storage for eventual use.

MR. HANSEN: I know it's mentioned in your update, in one of the tables. This makes me wonder, then, why you must go to the V-shaped cross profile for your revegetation as opposed to the square trench which it seems like it ought to provide better, I mean the square cross-section, would provide more room for rooting and that sort of thing for the plants, wouldn't it, than the V-shaped profile?

MR. GODLOVE: Well Wally, we stumbled on to that more or less by accident. We have originally gone with the square-shaped trench because we just assumed we'd take a ditcher in there and dig these trenches. In Cy McKell's work over at Anvil Points when they were working on the Woodruff-Clyde compaction pile, the way they developed the topsoil trench there was just take a motor patrol down the pile and tilt its blade and just basically create a furrow, a V-shaped furrow. Unfortunately I didn't have Cy here to discuss the benefits of that, but he feels from an operational standpoint that has certain advantages because it's much easier to form the trench that way. There is much less cost involved. It also allows what we feel to be a more efficient use of topsoil, because you don't have to put quite as much - a V-shaped trench doesn't take quite as much topsoil. So what you can do is you can create more of those V-shaped trenches than would have been possible with the rectangular trench. So we feel we can get more coverage of the pile. Also at Anvil Points, while the research is preliminary we now are in our fourth year of research on that type of a trenching operation. We are seeing what we consider to be very good success in the rooting of plants and the movement of the root systems out into the processed shale.

MR. HANSEN: Thanks, Jim, for clearing that point up. Tom Owen, did you have a question?

MR. OWEN: Jim answered it right there.

MR. HANSEN: Thank you. Is that it, Carter?

MR. GIBBS: Yes.

MR. HANSEN: Any other comments from the rest of the Panel in this matter, or is there anything else in general with regard to the update?

MR. WATSON: Yes, I had a general question if I could ask Lowell if he would go back on the slides to the isometric that showed the decline. My question essentially was earlier when you were making the presentation you pointed out that in the lower light green area, that would be one area where initial crushing would take place, and then about half-way up there's another crushing area consisting of crushing the material into a smaller size, and then the dog-leg, there would be a transfer of the crushed material to the upper portion at the dog-leg, and I was wondering what reason existed for not consolidating that function, i.e., the dog-leg transfer and crushing, the second-stage crushing, so it simply seemed a way to reduce a cost element. In other words, you have three specific cost elements right now. The initial crushing cost, part way up where you crush to smaller size, and then the dog-leg transfer point that performs no other function but to transfer that ore to a higher level. Is there a reason, some engineering reason why that could not be accomplished, so you could perform those two functions simultaneously?

MR. PAIGE: Let me make sure I understand your comment. You're suggesting the consideration of doing the secondary - we have two stages of crushing, the primary down here where the trucks dump, and then the secondary crushing and then it goes on the decline belt and you're suggesting the thought of the secondary crushing being up at the transfer station in the dog-leg?

MR. WATSON: Precisely, and incorporate those two functions and letting the secondary crusher be the feeder for the upper belt.

MR. PAIGE: That's a good thought, and the reason we didn't do that was that the dog-leg transfer point, which is a complex thing, and you're absolutely right, we could put a crusher in there, but the reason was that the dog-leg is an out-of-the-way place. It's difficult to get to because of the slope angles. The reason for the 15 degrees on the slope is that that is close to the maximum that we can run this material on a conveyor, and if you climb a 15-degree slope, you're going to have to whip somebody to go up that thing, or you're going to almost have to tie them back coming down it. Now I don't mean that in the sense of a safety problem but it is something that is a consideration, and underground there is a tendency to ignore difficult places to get to. I guess we do that naturally anywhere. We did not put any more into that dog-leg than just the transfer for the reason of accessibility in normal operations. The crushing station is not fully manned or not manned continuously. However, it will take a significant amount of maintenance and observation. We did bring it down to the bottom because it will be more readily accessible for that and we think we can maintain it better than we could up at the transfer. You're absolutely right, cost-wise for that function we would be ahead to put the crusher at the transfer and let the crusher be the transfer. We didn't because we feel overall in the operating costs we would lose because of less maintenance control. But it's a darned good idea.

MR. WATSON: Well thank you. That satisfies my question.

MR. HANSEN: If there are no further comments or questions from the Panel I will turn the mike back to Hank. Is there one more? Steve.

MR. UTTER: Lowell, on the methane gas, you mentioned for Phase 1 you estimate a requirement of 3 million cubic feet per minute ventilation air? (Yes) What do you estimate as far as the quantity of methane that would be liberated during that period, some average value I would assume.

MR. PAIGE: Yes, we have, and I'm not sure that I am going to be able off of my head to tell you all the numbers we've used, although I can supply them. We have taken from our core drilling, we have done a fair amount of measurement of gas emission from the core, which is really all we have now on U-a U-b. We have also studied the results of the gas make in the Horse Draw operation. That almost is the total gas work that has been done in oil shale. Meissel's report of the Bureau of Mines, some of his work was on our core that we did with them back in '76. We have taken a background estimate from mined areas in the panel and this is a number I'm not absolutely sure of right now, of some quantity per square foot of exposed floor and back and ribs and in combining that or calculating that constant that we've assumed based on our core work and on the Horse Draw work that we have developed the length of panels we think we can live with, and maintaining enough air to dilute below the, I think we're trying to dilute below or down to a half a percent. Then we have found, and if you would like I will get you those numbers, we have found that in using these calculations on background gas primarily, and then of course the gas that's made when we mine the face, we expect from our work about 75 percent of the gas at the face to be liberated at the time

we do the initial blasting, that about 20 percent of the gas, not the remaining gas but of the total, would be liberated in the crushing phase and the rest would sort of bleed off as the ore moves through the system. We don't really know, when we've bled it off in the core the curve was sort of asymptotic, and we've haven't had it long enough to really know if it ever does become completely void. We're assuming that it's a constant thing in the mine, we have not assumed any bleed-off after time, and our core drilling doesn't indicate much bleed-off in the core tests. So that's what we've used, and the air required for diluting the gas far exceeds the air required to dilute any diesel equipment that we have under ground, even if everything were diesel horsepower and it all ran at maximum rpm and horsepower, the air we need for the ventilation with the gas, the gas consideration automatically takes care of any diesel. So diesel use is not a detriment to the air requirements. I'm not sure that helps you a lot.

MR. UTTER: Well it gives me an idea, thank you. I assume you plan on some type of gas monitors and so on anyhow so if there is a radical change you would be aware of it, and take steps accordingly.

MR. PAIGE: That's right. We will be monitoring gas on six monitoring stations, many of them in the crushing area, along the belts, at the transfer point and at the exhaust shaft and then of course a lot of hand-held units in the mining area itself. Of course we'll have fixed unit heads in the maintenance shop and those areas where we really have permanent people, and we'll have a control station and a monitoring station of this in the underground, at the primary crushing facility, we will also have a monitoring panel that will be manned 24 hours a day, monitoring not only gas but CO and other things along with the operations on the surface, in the change room and we will have people covering both those areas. The surface station will not be the day-to-day operating station, it will be the control room underground. However, the monitoring room in the mine building on the surface will have override control to shut things down and to set off alarms if there were a problem in the mine and we lost control underground. So we will have it controlled both ways and we will also have our communications working from both systems. We will also bring our communications lines and control lines, through two entries, one shaft and one decline, so we come in with really two systems.

MR. HANSEN: Thank you. Betty.

DR. WILLARD: I'm curious if there's any way at all to capture that methane for beneficial use?

MR. PAIGE: My gosh, we're trying to get rid of it! Well, we've thought of that too because ultimately we've got to bring a gas line out there and here is a good source of energy. We don't think so, because with an underground mining operation, you know, we have to really bring our life-support system with us. We've got to maintain air that's good working conditions for people, and when you do that you dilute the doggone gas so much that the recovery is just prohibitively expensive, to recover that gas, because we've diluted it so bad. If we don't dilute it then we can't live in there, and so we're kind of between the rock and a hard place. We thought of possibly doing what they do in the coal business, and that's drilling ahead, bleeding gas off, and in that way you can use it. What happens here is that this rock is not that permeable and we can't get a reasonable bleed-off to any advantage to the mine. We've had many core tests out there for years,

and you can go to them today and open them up and they'll bleed gas almost at the same rate they did back in '75 and '76 when we drilled them. The stuff just doesn't move through the rock fast enough to be beneficial. So again, that's a good thought, we've worked on it, but don't see any solution.

MR. HANSEN: Steve.

MR. UTTER: I might mention, this methane gas problem is rather tricky, and of course the tendency is to go on past experience in coal mines, which you might find doesn't necessarily apply to the oil shale gas problem, and also of course the Bureau's done a lot of work on the idea of actually capturing this gas and bleeding it off, and using it commercially, and in fact they're doing some of that now. But the problem on oil shale versus coal is that roughly in oil shale you have perhaps 50 cubic feet per ton of shale broken, 50 cubic feet of gas released per ton of shale broken, and say in the Pittsburgh Seam, as I recall, you'd have around 500 cubic feet of gas, and even that probably isn't commercial. It's a good idea but we don't know how to use it.

MR. WRIGHT: It would seem that your change in procedure of going to a decline rather than a shaft is a major decision. I just want to know that it would seem that the decline would be much more expensive to construct, and I think you've indicated that you anticipate recovering that extra expense because of the reduction of the cost of the operation of a shaft. Can you give us some figures that would indicate proportionately the increased cost of the decline and how long a period of time you would anticipate it would take to recover that cost by the reduced operating expense?

MR. PAIGE: We have done those studies and since we have bid the job we do have some actual numbers now for cost of driving the decline and also cost of sinking the shaft. For the reason that we have not yet awarded this contract, and it's many, many millions of dollars, in fact it is the largest shaft contract that is being awarded in the United States right now, and it's generating an awful lot of interest in the shaft business. I really don't want to quote numbers because I know what they are, and it isn't fair to people to come out with something like that at this point in time. However, the decline per foot of advance is less expensive than the shaft per foot of depth, but there are more feet of decline, so the total excavated cost of the decline is higher. However, where we've found there was a significant advantage, the decline as you know, doesn't require any headframe hoists or loadout at the bottom, loading pockets and everything that goes with it, which are extremely expensive today, and even though the conveyor in the decline which we would roughly say is maybe a \$4 million item to buy that conveyor, that does not come anywhere near to the cost of hoist and headframe and things that would be required on the production shaft. So what we've really found, and it was confirmed in our bid prices that we now have, that the decline, actual construction of the completed unit for operation is not as expensive as a dedicated shaft for hoisting, although our projections when we made this decision, and you're right, it was a major decision to change over, we didn't have these good numbers that we've got now and we had figured there was something like about a 4-year payout in operating to offset what we then were estimating the cost of the decline would be over the shaft. The other factor, as I mentioned, that made a lot of sense to us was the reliability. You know, going into an underground

mining operation of 30,000 tons per day is, we're going to start out this mine as one of the largest mines in the United States, not just a little prototype getting started. There are very few mines that operate at 30,000 tons a day, even if they're old mines, and we're going to start that way, and our next step to commercialization will make it the largest mine in the at that and all the ramifications plus the fact that we expected it probably will be classified a gassy mine and these conditions that we were going to go for everything that we can get for reliability. We don't want to prototype any more than we have to, there will be enough surprises when we get there I'm sure.

MR. WRIGHT: By using a decline, as I've looked at the schematics where you have a fulcrum on the diagram and it comes back on itself, and then you say you're going to extend it out east from where it now makes the turn, is there a possibility that's going to save you if you were using shafts rather than the decline, is it going to save you an additional shaft later that you might have had over on the eastern end, or would that have been necessary?

MR. PAIGE: No, it doesn't change the shaft requirements for the future. The way we're envisioning Phase 1 that we're in a sense dedicating a portion of the ore reserves to the Phase 1 operation, we're looking at Phases 1, 2, and 3 as sort of separate entities. Phase 1 will operate continuously for the life of the ore body, and that Phase 2 will come in as commercialization and really the ore for Phase 2 and for the plant facility associated with that will come out, will be mined in a sense separately from the Phase 1. The additional shafts or declines would be required for the expansion to Phase 2 and 3 in either case. We really don't see any more production type of shaft. We may have to have service shafts added later on because of travel time problems and the costs associated with that, but the main shaft requirement in the future will be for ventilation, intake and exhaust shafts, and we will probably in the total development of the lease see something like 8 or 10 or 12 shafts in U-a U-b to ventilate this operation.

MR. WRIGHT: But all of the production will be coming out of the decline you're talking about now?

MR. PAIGE: Yes, the present decline system will continue to run for 25 or 30 years bringing out the ore for that Phase 1 plant, and the Phase 2 plant will use up that part of the decline and all of that ore will come out of that decline and then Phase 3 would be in a sense doubling Phase 2, going to 100,000 barrels, equivalent of 180,000 tons of ore a day which is just mind-boggling, and that would be another decline going off into the west and U-a.

MR. HANSEN: I believe that concludes the comments and questions of the Panel, Hank.

MR. ASH: Thanks, Wally. Eric, are there any further comments from the Oil Shale Office?

MR. HOFFMAN: Hank, the Panel members pretty well covered everything that was on our list of concerns as well, and we will be awaiting your formal letter of comment, hopefully get that as soon as possible, in the meantime the Oil Shale Office will press ahead with their decision process on the modification request.

MR. ASH: Okay, that memo will probably be brief, I don't see any unresolved problems arising from the Panel's comments and questions this morning, and we will plan on doing that. We will now take that coffee break, we're running a little behind schedule now, so I would like to expedite it if we can and start again in about 10 minutes. Thank you, White River.

Break at 10:30 a.m., back at 10:50

MR. ASH; The next item on the agenda is consideration of the 1981 Annual Report for the C-b lease project in Colorado. That of course is Cathedral Bluffs, and again I'll turn it back to the Oil Shale Office, Eric Hoffman, to introduce this matter. Eric.

MR. HOFFMAN: Thanks very much, Hank. What I think we'll do here first is to get a kind of a project update from George Fosdick on the C-b Project, and then we'll move into Panel consideration of the '81 report. Are you ready, George? George is the Chief Scientist, so to speak, for the C-b Project, and has come up here with briefing material. George, take it away.

DR. FOSDICK: Thank you for the promotion, Eric. I'm Manager of the Environmental Data Modeling Data Management and Research for the Cathedral Bluffs Project, and I'd like to at this time give you an update on our status. I'll be going back and forth to this schedule, this year with the approval of the Oil Shale Office in the spring, in March, with an update in July we've arrived at a mutually agreed interim development schedule and I'd like to go through that briefly with you. We've completed our shaft sinking in 1982, with our 34-foot service shaft and our 29-foot production shaft down some 16 to 17 hundred feet, and in the fall of last year the 15-foot-diameter ventilation escape shaft which was previously considered was allowed to flood with the approval of the Oil Shale Office so it is now flooded to a level of some 400 feet below the surface. I would like to show you some - I'll go through a few of these items at a time, this will show you what our production shaft looks like inside the headframe, some 300 feet high, it's got various floors here going from the bottom to the top, the subcollar and collar floor, near the ground level, the duct floor, the upper and lower power floors, where the power equipment is housed, the lower and upper skip hoist floors, where the skips are, the skip drum, hoist drums, are contained, and then the top. This is some three hundred feet high and I thought you'd like to see the different floors that have been completed in that particular shaft as of this time and I'll give you detailed status in a moment on the outfitting of that shaft. In particular, I thought this would be of interest to you, and that's the skips on the production shaft. Those are not wound around, the ropes are not wound around the drum. They are merely held on it by friction. We have a counterbalance between the so-called East skip A here and the west skip B, the hoists are some 52 tons in capacity each, counterbalanced and held on the drums solely by friction.

Next slide. Our construction status as of the third week of September, the service shaft, overall completion is some 95 percent complete. In the service shaft, we have three cages, two small man cages of 15 capacity each and a 270-man two-story main cage. Cage No. 1 is undergoing checkout. No. 2 is operational in the manual mode. The main cage was roped up August 30 and a checkout was completed as of

September 15. In the production shafts, the headframe is overall 90 percent completed. As I mentioned, the skip hoist of 52-ton capacity, and this particular hoist operates at some 1500 feet a minute. The service hoists out there operates at some 800 feet a minute. The 52-ton hoist is scheduled for completion in the middle of September, and checkout completed by October 14. The second of the two hoists is scheduled for electrical completion only, and check-out of that by October 14. We will completely have commissioned the hoists in the month of October and the contractors will be pulled off in the middle of October. The associated power substation to provide power to the shaft, that station is about 95 percent complete at this time.

Going back to Line Item No. 3, production and shaft dewatering, we have, as I mentioned, allowed the ventilation escape shaft as of the first of September to flood. During the last year the peak dewatering rate was about 1500-1700 gallons a minute, and by virtue of allowing the escape shaft to fill, the gallons per minute are some 400 to 600 gallons at the moment, and we continue to dewater both the production and the service shaft, and a little more detail on our water management program associated with that. The previous year we had three modes of water management and disposal. We had a sprinkler irrigation system with a capacity of some 550 to 600 gallons a minute. Coupled with that we had a reinjection well, with a capacity of some 550 to 600 gallons a minute, and we have an ending NPDES discharge permit which allows us to discharge from our ponds, A-B we call them on tract. So we have utilized all three modes in the past. As of July 1 of this year we stopped the reinjection mode partly because it is consistent with our reduced budget to save some money, and partly due to the fact that the farmers and ranchers along Piceance Creek really do appreciate the water. So those things coupled together we felt that the most practical mode right now temporarily is to discharge under our valid permit. The permit itself is due to expire in December of this year, and we have applied for an extension to that permit as of June 30. So we have some detailed and frank discussion going on with the State Department of Health in the water area trying to mutually arrive at what we feel are reasonable parameters for that plant. Our water monitoring is continuing under the approved interim monitoring plan and I will have more to say on the environmental side in just a moment on that.

Our site operations and maintenance will continue throughout '82-'83 and I will show you a manpower level on that in just a moment. The environmental monitoring program will continue as I mentioned previously in March of this year we mutually agreed on a level of monitoring with the Oil Shale Office which was gone over with you at the previous OSEAP meeting. Just to summarize that, the interim monitoring program as of March was some 60 percent of the previous monitoring level effort, and in July we cut it another 5 percent, so we are roughly at 55 percent of the previous program and scope. Previously, as of October of last year we had two air quality sites. We have instituted a new one-station 26 south of the tract in pristine condition. We have impacted a little bit on tract primarily because of particulates at the present time, but station 22 on tract is continuing and has been in operation since September 1974 providing us with a very good continuous data base. Associated with that station is a 60-meter tower instrumented at three levels which has been in continuous operation since 1974 also. We have a visibility site at Hunter Creek which provides in a joint activity with the C-a project, provides us with visibility data for 10 days in the

spring and 10 test days in the fall. We have two precipitation stations at present. So to summarize our air program between March and July, we've cut back to one air quality station from two.

The water program consists of eight stream gaging stations from which data is obtained by the USGS with some 12 springs and seeps, 15 alluvial wells, and some 57 deep well strings. Some of these wells have as many as four strings per well. They are instrumented to take level and water quality data in the four zones that we've designated, the upper Parachute 1, Upper Parachute 2, Lower Parachute 3 and Lower Parachute 4. Those are the different regions of the aquifer.

In biology, the program continues to encompass the large mammals, the deer, the medium sized mammals, the Lagamorphs, the rabbits, and raptors. The aquatic program continues with the benthos and paraphytins, we continue to measure vegetation productivity, micro-climate measurements continue, threatened species, and revegetation tracts are in continuation. Really the only difference in program from what was explained to you at the last meeting is the small mammals. We now have ten randomly located cages in that program as opposed to what we had before, and we think that this is an improved way to go about that sampling anyway.

In the reporting, we will continue to have our Annual Report Volume 1 that summarizes the project operations, costs and environmental monitoring. We plan to cut out the detailed environmental monitoring report for 1982-83, but the semi-annual data report we will continue at the same level, probably with increased data in that to compensate for the one volume of the Annual Analysis Report which we will temporarily drop.

An item of much interest to you is the DDP, and associated with it the PSD, we have to do the two of them almost hand-in-glove. The DDP is still planned as shown on the schedule for some time in 1983. The quarter is somewhat flexible. We're arguing among ourselves as to whether it should be earlier or as shown on the program, but the plans are to the best of our knowledge right now for submittal in 1983 of an updated Detailed Development Plan.

With regard to the next item on engineering analysis, which is scheduled for heavy activity in 1982 and continuing to prepare the basis for design in 1982 and 1983. Skipping the next line entry for a moment, and coupled with that modified in-situ engineering analysis and design as ongoing efforts, I'd like to amplify that a little bit. At the present time, this spring, summer, and right now we have looked at over 40 project options. In the above-ground retorting, we are looking at one module for the above-ground operations, utilizing demonstrated technology, and if you would bear with me in this regard I have been directed not to pinpoint one specific technology at this time since the studies are still under way with regard to both cost and engineering and no conclusion has been reached as to selection there. The mining method, we have looked at several room-and-pillar mining alternatives and that's labeled as a first case, it appears that that is a very promising way to go there. But we've looked at alternative methods there including blast hole stoping. As I understand that particular technique it is one big room which may be as much as say a thousand feet long. At the end of this particular room as you go along with the development you blast, if imagine a circular ring, a perpendicular circular ring, where the back is horizontal, you

blast around that periphery of the ring and remove the mined material there and continue that advancing face in this big room for a thousand feet nominally. That hasn't been selected, that thousand feet dimension of course is still open for consideration but it really is a long room.

Coupled with the above-ground retorting concepts, what looks most promising to us at the present time is to use modified in-situ for secondary resource recovery, and what we mean by that in the room-and-pillar mining after that exists it is beneficial to either go in to those pillars in the room-and-pillar mine and utilize that material in an MIS concept or possibly underneath the room-and-pillar mine to have the modified in-situ at a level below the room-and-pillar mine. It looks most promising as you get toward commercial operation to bring the modified in-situ on board after the surface retorting is initially brought on line. The objectives still remain the same as we published in the schedule, to begin mine development in 1984, to begin surface construction in 1985, and to start production in 1988.

The next item that we have on here is retorts 7 and 8, modified in-situ tests at our Logan Wash facility, as shown starting in 1982 through the fourth quarter of 1982. With regard to those items retorts 7 and 8 have been producing at approximately on the average of 1,000 barrels per day total between them since their inception at the beginning of the year, and they have produced as of the end of August approximately 130,000 barrels of shale oil, and at the present time this is the largest production of shale oil in the United States. We anticipate several more months of production from these side-by-side modified in-situ retorts.

I have talked to you about that modified in-situ engineering analysis. The Union B retort tests were conducted in the spring of 1982, that was approximately a 1-month-long test on C-B shale. Two grades of shale were run through the Union test, 36 gallons a ton for approximately 2 weeks followed by 28-gallon/ton for nominally one week. So the whole test was nominally a one-month test. The results are not all in yet on this, the report has not been published but in general the test was a satisfactory test.

The geotechnical program details will have to wait the mine design, so there is no activity scheduled until the second and third quarter of 1983 in the geotechnical area. The bottom items on here, the VE shaft dewatering, mine development, surface construction, I've alluded to in 1984 for the mine development and 1985 for surface construction and dewatering the VE shaft in 1985.

The present level of manpower on the tract, construction workers are 3 on the tract at present, operations and maintenance 5. By year-end they'll have to jump to 12 to compensate for other decreases. In purchasing and the warehouse we have two people, environmental staff is anticipated to stay at five on the tract. We have four back at our Grand Junction office in addition to that. Health, safety and security four on the tract diminishing to three by year-end. Clerical three, diminishing to one, so the total of C-b at year-end is anticipated to be 21 people. The contractors, Harrison outfitting the shafts, have got 91 people there, NACO 21, and Canadian General Electric two, for a total of 114 people on the contractors' side. As I mentioned earlier, they are due to be pulled off in the middle of October when the shaft outfitting is scheduled to be completed. So by year-end we expect no more contract people on board.

That's where we stand right now at Cathedral Bluffs.

MR. HOFFMAN: Thank you very much, George. Does anyone have any questions about the current status of the C-b project they would like to ask George?

MR. WATSON: Yes, I'd like to ask one question. George, you indicated that you are getting into some extensive negotiations about an extension of the dewatering permit. Who issued the initial dewatering permit?

DR. FOSDICK: The State of Colorado, Water Quality Division.

MR. WATSON: And when was that? What year?

DR. FOSDICK: That's back quite a ways, I'm not certain on that, '76 or '77.

MR. WATSON: So what major changes are you proposing?

DR. FOSDICK: They put a time limit on the permit, and the time limit is up in December this year. They just put an end date on it and we have to reapply.

MR. WATSON: Well, what are the issues other than just a time extension, are they asking you for some additional requirements?

DR. FOSDICK: Well yes we are arguing at the numerical values on some of the parameters and I don't have them in my head to tell you what those values are, but one of the things, for example, in the present permit fluoride was specified. To the best of our knowledge there are no valid criteria for what the levels of fluoride ought to be and the State has agreed to this to the extent that fluoride will be removed as one of the criteria in the new permit. It's more or less a running argument as to what the levels of some of these constituents should be and as you know, in the middle of October the stream classification for Piceance Creek and some of the other rivers and creeks in the State is coming up, that's the middle of October in Denver. That has some bearing on what the levels of the associated water parameters should be, because each respective classification of the stream has associated with it numerical values of some of the parameters. So the stream classification is at issue.

MR. FERRARO: Some of the parameters that are at issue may not have State standards but the permit writer tries to evaluate potential impacts on aquatic life and cattle and wildlife, whatever, and that becomes somewhat engineering judgment and I think that is what George is discussing, becomes an issue. If you don't have a specific number to deal with and so you've got to do whatever research and look at what is in your literature and make the best judgment to minimize the impact downstream. And that's been the big controversy between the Department and Oxy over the last few years.

DR. FOSDICK: We look at what we consider to have been the historical beneficial uses of the stream and what we feel is a reasonable level of the water quality parameters should be consistent with that use, and sometimes we don't all of us have same opinion as to what level these parameters should be consistent with that use. We sometimes have honest differences of opinion as to what the

uses should be or have been. There is a lot of give and take with this and we're working honestly hand and glove with the people of the State right now to arrive at something that's mutually beneficial. We've done fish toxicology studies and the like to try to bring a better understanding, we've had our consultants in fluoride work with us to try to increase our understanding from our point of view of what we should ask for on that permit issue.

MR. WATSON: Well does it look like these issues will be resolved by the end of the year?

MR. FERRARO: Well I assume it will be resolved shortly. There's a whole new issue and I haven't looked at what our people are recommending at the moment. It could be another issue in terms of the whole classification, the reclassification. The State has finally arrived, in that part of the State, and the procedures are that EPA requires and the Federal law requires that the State reevaluate the water quality standards every three years, and it's taken a number of years to go through the State, starting I guess in the South Platte and some of the other basins and they have just been moving around through the state and doing a very, very thorough job, and it's taken a lot of time to go through that process, and they finally have gotten to the point where they are making recommendations as to what the classifications should be, the new classifications. The hearings will be held in October to hear testimony on those proposed classifications, and the related parameters that are associated with that, and then once the Commission gets all the testimony they then make a judgment as to what those classifications will be. Any new permits would have to be written to reflect the new ones.

DR. FOSDICK: Correct me if I'm wrong Paul, but I believe the whole northwestern part of the State has never been classified with regard to stream classification.

MR. FERRARO: That's not correct. Certain streams were not classified, but the entire major streams in the State were classified quite a number of years ago.

MR. HOFFMAN: I am sure the Panel is aware of the fact that the Oil Shale Office under the lease terms is obliged to require the lessee to conform not only with lease terms but with all applicable State and local regulations, so we are very keenly interested in the outcome of these permitting discussions and getting the parties together to expedite resolution. Does any one else have any questions of George?

MR. FERRARO: Not a question, but it seemed like a year and a half ago or two years ago you were at the State Air Quality Commission arguing about the requirement for SO<sub>2</sub> because your MIS process could not handle that, and now I guess you have found through research that maybe that system isn't economical, it seems like you are starting to abandon the whole concept, at least what I got today?

DR. FOSDICK: Well we have had modified in-situ as a secondary resource recovery, so modified in-situ still looks promising as you proceed along your progress toward commercialization, and I believe, correct me if I'm wrong, Paul, that the permit we were seeking 3/10s of a pound per barrel of SO<sub>2</sub> seeking that that lid be raised if possible, and I believe the way that permit, we never got that permit applied for as you know to the EPA, the PSD permit was withdrawn, but I believe

the way it worked out we ended up having no more approval than 94,000, the equivalent in sulphur, of 94,000 barrels a day. If you take that 3/10s and multiply it by the 94,000 I forget how many tons a day it was, 27 or something like that, tons a day, that's the reason we never got approval to exceed that. So that what we said we would do in that permit was that in the intervening time between now and then that we would seek whatever improvements in best available control technology we could achieve for the modified in-situ so that when we reached that production capacity lid we probably might be able to achieve improvements in the technology I don't believe that you ever lifted that 3/10s of a pound per barrel if I am correct.

MR. FERRARO: That's correct. The way it was designed was that if you were talking about 117,000 barrels per day, that was your facility, then they would scale it back so you weren't getting away with anything. In some respects the way I look at it is it was to your disadvantage because you couldn't go to the full capacity that you had designed.

DR. FOSDICK: Well as production increases you don't have a great big square wave where you increase your production from 10,000 barrels a day automatically to a hundred. You would expect a gradual increase in that, and that takes many years to achieve and I believe we said that we would look at increases in technology between now and then so that we would be able to have the 117,000 barrels with no more sulphur in the air than was equivalent to 3/10ths of a pound per barrel times 94,000 barrels.

MR. ASH: Thank you, George, another question?

MS. GRASSER: I had a quick one. You were talking about applying for your PSD permit in 1983, is that correct? Okay, and right now I think I heard you right, that you were doing visibility monitoring on your scaled-down system about 10 days per year. When will you be increasing that visibility monitoring and how did you select the 10 days per year - what criteria did you use for that?

DR. FOSDICK: Visibility monitoring has been going on since 1975. Originally in this joint program we had 20 days in the fall and 20 days in the spring, and we looked at the data and found that we still had sufficient statistical significance to cut it back to 10 days in the spring and in the fall, and there is no activity on our part of any consequence going on at the moment in the Basin to cut down visibility. We see no decreases in visibility from nominally a 100-mile typical ranges since we've started the program. So we plan to continue it at that level. We concurrently use two different instruments, one photography, and a tele-photometer side by side which is acceptable state-of-the-art technique for doing this, and in addition to that we take particulate samples on the tract every fourth day and during the visibility tests we have site distribution on particulates that we obtain. So we feel that this program is more than adequate at the present level of activity on the tract. When operations start to increase the program then may have to be modified but as of right now, the program as instituted in the first place at the Oil Shale Office's insistence, there was no regulations at that time, nor is there any hard-and-fast regulation on visibility at the present time, but we have continued this program since '75 and we plan to continue it at the present level. Does that answer your question?

MS. GRASSER: It does. I am still a little concerned about the limited amount of time that you are monitoring but I guess that makes sense in your slowed-down phase. Are you monitoring once a day during this 10 days, or is it continuous?

DR. FOSDICK: We take hourly measurements for 7 hours in every day, in each of four views, and in some of the views we have multiple objects. The view range is approximately, greater than 90 degrees, we are looking almost due north to almost looking due east, which covers the Flattops. The more easterly one covers the region directly between us and Flattops. So we get readings all throughout the day, and I neglected to mention that when we started out in 1975 we did this quarterly 20 days each quarter, and on the basis of that, good baseline, we felt that 10 days in the spring and 10 days in the fall was adequate for continuation.

MR. FERRARO: I think I need to clarify that SO<sub>2</sub>. I don't think we said it right. I'll just rephrase it. The regulations say that you cannot exceed .3 pounds per barrel of SO<sub>2</sub>, and you came in two years ago and argued that you could not stay within that limit.

DR. FOSDICK: For modified in-situ.

MR. FERRARO: Yes, and that you needed something higher than that, and the State said well then what we will agree to is .3 times 117, that would be your total, and you would reach that at 94,000 barrels.

MR. ASH: Thank you, George. We want to also consider the 1981 Annual Report from C-b which was distributed to the Panel members at our meeting in Glenwood Springs. This is a while to get back with comments but we have asked our members to review it and our Workgroup Chairman, Andy Heard, to take the lead in this review. Andy.

MR. HEARD: Thanks Hank. In the review most of the workgroups have reviewed it, have had an adequate opportunity as you pointed out, and the informal conversations that I've had with the members of the various workgroups and the C-b workgroup, they think the report is very well written and we have no real significant comments, although I think for the record we should open it up and let the Panel raise any questions or make any comments they feel required. I do believe in the interest of time we should not formalize that process by going through the listed workgroups but let them comment as they can.

MR. GIBBS: You can always depend on a forester to fill in the blank. The only comment basically that came from our group was that we were impressed with the mixture of species that are being used in reseeded as well as the use of transplants. We would expect that if our calculations are correct that probably you have a much higher density there than you would have in the surrounding area and that eventually as your transplants take over that you'll probably come back to the level of density that you had prior to the disturbance. The other question that was raised in the group is you appear to be interested in improving the vegetation. The vegetation will not be what your baseline data showed, is that correct?

DR. FOSDICK: I think you better talk to Ed Baker about that, he is our biologist. To the best of my knowledge the seed mixtures were approved by the Oil Shale Office and all the biological people involved, and I don't believe we're going to

improve it over the way we found it. I think if we can leave it the way we found it that should be satisfactory. There again I think that detail, if you want an answer, I think I better get Ed Baker in line with that.

MR. GIBBS: I would guess that your species composition in terms of at least wildlife and forage would be better than the original. That's just a guess, question.

MR. HOFFMAN: Here again the lease requires that the reclamation achieve a condition on tract that is at least equal to if not better than the surrounding land use and support capability. C-b as well as the other lessees have been striving for a vegetative composition that is of greater utility than presently exists by replacing many of the possibly marginally grazable species with more palatable plant communities that would be expected to self-sustain itself under normal conditions in the basin.

MR. ASH: Let me interject a comment here regarding this Annual Report, and it was in several volumes. What was distributed to all the members was I believe it is called the Summary Volume. If I haven't mentioned it before, I want to let you know that we have a few copies at least of the other volumes, some of which include back-up data and if somebody is particularly interested in a given area, check with us and we can provide you a copy or at the minimum a loan copy. We haven't asked for copies for every member of the panel of all the individual volumes - I think there were three volumes, something like that, but if somebody is particularly interested in back-up data they could be made available to them. We have generally distributed the Summary Volume.

MR. WATSON: When do we do an EIS on all the data we require?

MR. ASH: We wait till we get sued, Clarke.

MR. HOFFMAN: As Hank underscored, the other volumes are available and if he runs out we can make additional ones available, what George was talking about in his presentation is that these data analysis volumes will not necessarily appear as part of this year's and next Annual Report from the lessee. In place thereof, a greater emphasis on interpretation will be presented in the actual data reports that are submitted to the Oil Shale Office semi-annually. This was both an expediency move as well as a cost-conscious move. Once actual development begins again on the tract, mine, surface, what-have-you, they will return to a reporting scenario similar to that which existed in 1981.

MR. BOEKER: Andy, I have a general observation I would like to make regarding environmental monitoring. Now my comments are not aimed specifically at C-b's annual report. It's more or less a compilation of the environmental monitoring reviews that have been carried out through the entire prototype review process. I've come to the conclusion that I have great respect for industry's environmental teams in their continuing efforts to measure the impacts of development actions on the components of the surrounding ecosystem. They have demonstrated a professional competence through the extensive field observations supported by computer technology and ecosystem modeling procedures. However, when these environmental teams consider such uncontrollable factors as (1) the inherent

variability within the ecosystems, (2) the annual population fluctuations without definable patterns, and (3) the effects of seasonal, annual, or long-term climatic variation, that the best of these teams end up with the dilemma in making firm conclusions as to whether significant changes are occurring and if so, what may be the cause for these changes. As a result of considering these problems I sometimes wonder if we all need to back off and regroup somewhat, perhaps to redefine the overall objectives of the ecosystem or environmental monitoring. It seems like there's a tremendous amount of effort that is being carried out to reach objectives or goals that perhaps are unattainable within the scope in which they've been framed. I'm not trying to sound like a heretic at this stage of the game, but I think it's something that the entire Panel might want to consider.

MR. HEARD: Thank you Hal.

DR. WILLARD: Well I think in response to what Hal just said, though, I think that maybe it's a little bit early for us to be knowing what these trends mean and maybe we're trying too hard to interpret trends which we need to have more data on for a longer period of time. So I would rather keep on, at this point, and maybe after we're 10 years out start looking at it, and one of the things that we're hard up for in ecology is this long-term data, and that's one thing that we're going to get from this whole thing. We're going to benefit, I'm sure, and one of the reasons we can't come up with more definitive answers, environmentally, is because we haven't done this long-term monitoring. So I would hesitate to have us jettison anything that we thought was not cost-effective at this point in time.

MR. BOEKER: Yes, Bettie, I appreciate your putting this in perspective. The only thing that I ask for is that we are aiming at an obtainable target, that we be confident that we have defined the right targets.

DR. WILLARD: Maybe this should be on the agenda for the next meeting, that we really discuss this issue from all aspects and see if we can come to some decision about targets.

MR. ASH: I appreciate the thoughtful comments from both of you. I think it is something that we can look at a little further perhaps at the next meeting. I do appreciate it. I know there has been a recognition that in some cases the original requirements were a little bit on the overkill side, and through mutual agreement, discussion with BLM, the Oil Shale Office, and in this Panel some things have been cut back, but I realize that is not exactly what you're driving at, Hal, but there were some overkill requirements and some of those have been recognized and reduced. Andy.

MR. HEARD: I think that is it. I too appreciate these comments and I am sure the Panel does. With that I turn it back to you, Hank.

MR. ASH: Okay, thank you. We will provide you a brief memo, Eric, saying there is nothing major from the Panel on that matter. We have a suggestion to the Panel, we're a bit behind schedule, I would judge that we have another hour, or hour and a half worth of business to transact. I know we have some people that want to catch an afternoon plane at 2:30 or so, and Carter Gibbs has got an elk waiting for him on the other side of the Uintahs. What I am suggesting is that we

not break for lunch in the near future but continue on through the lunch hour and adjourn the meeting early this afternoon, to help facilitate these things. Is that agreeable to the Panel? Okay, we shall plan on doing that, and return to the agenda, for now I'm going to skip discussion on Rio Blanco's C-a lease project and first ask, as scheduled at 11 a.m. if there is anyone in the audience that wants to offer any comments to the Panel on oil shale or anything else exciting? We hadn't heard from anybody that they wanted to. So if there is not, we will go then next to a briefing by the Geokinetics Company on their in-situ oil shale project. We have representing Geokinetics here today Rusty Lundberg I believe it is. Dr. Mike Lekas, the President, had planned to be here but couldn't make this meeting. For any of you that are not aware, this is probably the one oil shale project besides Oxy's Logan Wash that's actually producing shale oil today.

MR. LUNDBERG: Let me just say it is a pleasure for Geokinetics to offer a few words and provide some information and update, a status report on our project in developing a horizontal in-situ process for shale oil extraction. You will have to excuse my notes here. Also, I didn't know if I'd make it down - I live out at the field site and with all this rain it is quite muddy out there, you probably realize that from your tour of U-a U-b the other day.

My presentation this morning consists basically of two parts. The first one deals primarily with the process technique itself, to outline exactly what we do, the applications of this particular process, and I'm sure some of you are very familiar with a lot of these items. The second part will be a brief summary of selected environmental research activities that have been conducted concurrently with our pilot plant operation. Unfortunately I do not have slides covering aspects of the environmental work but do have several slides here outlining the process involved.

Since early 1973 Geokinetics has been involved in developing a process that is specifically designed for areas where the oil shale beds are relatively thin and close to the surface. Deposits with this type of characteristics are found throughout many parts of the world, particularly Morocco, Brazil, here in the United States, and elsewhere throughout the world. Here in the Uintah Basin, specifically in the southern Uintah Basin, shallow oil shale deposits, to which the Geokinetics process is applicable, contain over two billion barrels in place. Major developers have generally ignored these deposits, and it was here that Geokinetics was able to obtain its lease holdings. Presently, we do hold nearly 30,000 acres which contain roughly an average grade of 22 gallons per ton at an average depth of around 44 feet in thickness.

In cooperation with the U.S. Department of Energy, Geokinetics is engaged in developing a true in-situ extraction process on shallow oil shale deposits. The process does not require the construction of a mine, surface retort facilities, or the use of rock-moving equipment which are generally associated with underground and strip mining. The elimination of these items greatly reduces the initial or front-end capital costs of a commercial operation. Now because of the scattered nature of our single state school sections, a commercial operation, just to give you an idea and envision what would happen as a commercial project, a commercial operation for the Geokinetics process will consist of a single 640-acre lease producing roughly 2,000 to 5,000 barrels of shale oil per day. After the

start-up of a commercial operation on the first lease, an additional lease will be phased into production every two years so that an eventual simultaneous production from all leases would total 20,000 to 50,000 barrels of shale oil per day. This concept of a phased approach to commercialization allows for production of oil with small capital outlay, and allows for optimization of the process during the scale-up procedure.

I might explain for those who are somewhat unfamiliar with the process what exactly takes place in developing an in-situ retort and thereby horizontally retorting the shale. In the process a pattern of blastholes, and this is the initial cross section of the land, the overburden already over the shale, and I might put a qualifier on this is that this application is indeed for relatively thin oil shale beds that are fairly close to the surface. That is the initial cross section, we then drill a blast holes from the surface through the overburden and into the oil shale bed. The holes are loaded with explosives and detonated according to a very carefully planned, and I emphasize that, carefully planned blast pattern. As this schematic shows, during the blasting itself one end begins and then eventually is horizontally fractured throughout the desired oil shale bed until we develop the full rubblized area which we intend to retort. Now I might give a surface view of what takes place and give you a little more detail on that. Here we have what is Retort 25, this is one of our commercial-sized retorts, what you are seeing there is roughly about a surface area of approximately one acre, and you can see the outline of the retorting area based upon the tailings left from drilling. You're looking at 200-some-odd drill holes that were drilled for placing the explosives down into those holes. So this is what it looks like before, what you see in the foreground is a target, and on the retort itself there are some targets that help us in reference as we take high-speed photography of what takes place on the surface, and thereby give an understanding of exactly what takes place during the blast. So as the round is set off on the right-hand side of the screen you see that that side of it, there's more dust there. This is because that part of the round is detonated first. The reason for this is that we do not have a free face to work from and thereby need to create the void that we need to have a permeable fragmented mass of oil shale, we begin by uplifting that segment of the retort bed and thereby a time-delay sequence falls in place with the remaining blast holes. So what you see now is basically the whole round going off now, a continuation, until after the dust settles you have yet, what I'm explaining here is that the one end does uplift the overburden as well as the ground surface. As that uplifts the rest of the round on a time-delayed sequence will horizontally move into that uplifted area so that you have a very good permeable bed through which air flow may pass. So I hope that gives you some idea of how we create that in-situ retort for our purposes. Then the rubblized zone constitutes an in-situ retort, this is a side view again, showing exactly what happens after we have detonated the explosive. We go back and from the surface drill air injection wells as well as wells to provide off-gas or air outlet wells and production wells. So that air injection wells are drilled at one end of the retort and off-gas wells are drilled at the other end. This is an aerial view of the entire retort after we have placed all the surface piping on the retort, as well as the surface equipment in the background for removal of the oil and water from the ground.

The oil shale bed itself is ignited at the air injection wells by supplying a heat source, such as lighted charcoal, and carefully increasing the air flow into the

retort until a combustion front is established over the entire cross-section area of the fragmented zone. The combustion front is moved horizontally through the fractured shale towards the off-gas wells at an average rate of one foot per day. The fire front advance rate is monitored through the use of thermocouple wells spaced throughout the retort zone. This is basically taken from the 800-degree Fahrenheit isotherm measured by the thermocouples that are placed down into the retorting zone, approximately Day 10 after we have begun the ignition process. As you can see on the screen there, it will progress from left to right from the other end to the air-out.

As the firefront moves from the air inlet wells to the off-gas well it burns the residual carbon on the retorted shale as fuel. Process gases are recovered by the off-gas wells where they are brought to the surface and incinerated in the afterburner. You can see the air-out manifold as well as one of our production pumps bringing the oil and water out of the retort area.

Typical oil recovery rate from current retorts is between 100 and 200 barrels of shale oil per day. The rate at which the oil is produced is related to the amount of air injected. This is a graph indicating this. The X axis being time and the Y the number of barrels produced with air flow line to no scale, but it does show you that as we vary the flow through the retort zone there is a subsequent effect on the oil production.

Since the process does not consume water all of the produced water is available for dust control or is disposed of in a lined evaporation pond. Approximately 98 percent of the produced oil is condensed within the retort and produced as a liquid. The remaining oil is produced as a mist entrained in the off-gas and is collected in cyclone-type mist eliminators. The off-gas collected from the retort is combustible, averaging 70 to 100 BTU per standard cubic foot. This gas burns readily and is produced in quantities sufficient to give it an energy value equivalent to the produced oil.

Geokinetics began field testing of the process in the summer of 1975 at our current project site, as indicated by this slide here. Initial activities concentrated on small blasting experiments to aid in rubble characterization. During this period 14 separate retorts were prepared and burned. The testing resulted in the issuance of a number of patents pertaining to controlled breakage of shale beds at depth. Once the blast design had been determined it was scaled up, culminating in our first commercial size retorts measuring, as I said, approximately one acre in surface area, and containing nearly 40,000 barrels of shale oil in place. A total of three such retorts have been prepared to date. Two of the retorts have been processed already with the third one currently in progress. Over 40,000 barrels of shale oil have been recovered from these commercial size retorts. With one of them still in progress we expect an accumulated total from the three retorts to approach 55,000 barrels. Two additional retorts have been developed and are about twice the surface area (or approximately 2 acres) of our first large retort. Here you see the surface of the first 2-acre size retort if I may term it that with the drill rig in place drilling some of the blast holes. A preliminary comparison of the different large-scale retorts, and I mean one acre to two acres, indicates that increasing the surface area to two acres results in (1) greater blast efficiency, (2) increased resource utilization, and (3) greater

cost effectiveness. In a commercial operation a number of retorts of similar size would be operated simultaneously to obtain the desired rate of oil production.

During the course of our development work, Geokinetics has produced over 50,000 barrels of shale oil using this in-situ process. Most of this oil has been marketed to local refineries, at which time the oil is sold as crude shale oil without nitrogen removal. This is a typical oil analysis of the oil that we produced at our particular location in the Green River Formation from the upper Mahogany Zone.

The production and sale of Geokinetic shale oil has created a number of firsts in the history of the State of Utah. We were the first company to pay royalties to the State on the production of shale oil, as well as the first company to sell shale oil to a refinery in Utah. When the refinery marketed the shale oil product in Utah, they were the first to collect on a piece of Utah legislation that allows synthetic fuels produced, refined and marketed within the State to be exempt from Utah State road tax.

The horizontal burn, as being tested at the field site, has application toward deeper shales when applied as a secondary recovery method in a conventional room-and-pillar mine, as was mentioned for C-b. A typical schematic for that would be to have the room-and-pillars orientation there as pictured on the slide. The pillars and lower grade floor and back would be shot into the mined void, forming horizontal retorts available for additional oil recovery. Currently a feasibility study is nearing completion discussing this particular technology at our Agency Draw property.

By 1983, pardon the blank, but this is the transition into the environmental segment, we expect to have achieved our overall program objectives of developing and testing the Geokinetics' horizontal in-situ process. At that time, we should have sufficient technical, environmental, and economic data on hand to begin construction of our first commercial production unit on the State lease sections we refer to as Wolf Den. The project will produce approximately 3500 barrels of upgraded shale oil per day and 52 megawatts of electrical power generated from the low BTU off-gas produced from the in-situ retorting. In the course of developing the horizontal in-situ process, Geokinetics is working on the frontier of knowledge, both technically and environmentally. From the infancy of the project it was essential that the advances in technical knowledge be paced by simultaneous advances in environmental knowledge. To this end, Geokinetics has developed and implemented, under the auspices of DOE, a concurrent environmental research program to (1) monitor and assess associated environmental impacts, (2) to develop proper mitigation measures, and (3) to collect sufficient data to support environmental permit application requirements. The environmental program has grown with the technological advances achieved by the current pilot plant operation. Now with the construction and operation of commercial size retorts, environmental compliance and research activities are kept abreast with other facets of the project. To date, several technical reports detailing the results of specific environmental studies conducted under the framework of the Geokinetics Environmental Research Plan have been published in quarterly progress reports submitted to DOE/Laramie Energy Technology Center as well as separate research reports.

Previously, an Environmental Assessment was completed in accordance with the requirements of the National Environmental Policy Act as a result of the DOE/Geokinetics joint venture. The Environmental Assessment was published under the auspices of DOE and addressed the environmental impacts of the experimental programs. A finding of no significant impact was rendered in response to the Environmental Assessment.

In addition to the environmental studies that have been and are still in progress as required by our Environmental Research Plan, other research activities have been conducted at the project site. These studies have been performed under the sponsorship of Government agencies and well-qualified research facilities. I would like to briefly highlight a few of these studies. Under the direction of the DOE Oil Shale Task Force, a research plan was developed in order to evaluate potential health effects associated with the Geokinetics' horizontal in-situ oil shale process. This research plan was a cooperative effort among the Rocky Mountain Center for Occupational and Environmental Health of the University of Utah, Los Alamos National Laboratory, and Colorado State University. Components of the research program were an industrial hygiene study, toxicological testing, and medical surveillance of workers and families residing at the field site. The objectives of the industrial hygiene survey was to define and characterize potential inhalation exposures associated with the horizontal in-situ process. A complete discussion of the results of the industrial hygiene study as well as the results of the medical surveillance and toxicological tests are to be incorporated into a forthcoming report to be issued by the Los Alamos National Laboratory.

Also, under the same environmental research plan developed by the DOE Oil Shale Task Force, a preliminary on-site survey of potential reclamation issues was made by Ed Redente of Colorado State University and also a member of the Task Force, whereby a limited number of soil and vegetation samples were collected and analyzed for trace element concentrations and trace element uptake. Results from these early analyses indicated that reclamation problems will not hinder Geokinetics' progress towards commercialization.

One other study, in 1980, DOE issued a directive which specifies that major DOE operations will have an Environmental, Safety, and Health Protection Program (ES&H). To comply with this directive DOE contracted Radian Corporation to perform a preliminary audit of the ES&H program at Geokinetics. The procedure for this audit included the following steps: (1) to review records of the Geokinetics operation provided by DOE, (2) to meet with DOE and Geokinetics personnel, (3) make a site visit and records review of the Geokinetics field operation, and (4) render interpretative analyses and prepare a report of findings. A final report for the preliminary audit was submitted to DOE in April 1981. Constructive on what actions could be taken to update the initial environmental program developed before 1980 to achieve the new ES&H program requirements was outlined in the final report. Overall, the Geokinetics program was well developed and had the basis of an effective health and safety program for the level of operation. As the experimental work continues to increase, we will be adapting and implementing the recommendations summarized by the report into the current program and to insure a safe and productive work place.

In order to fill the need for preliminary data on potential environmental impacts of an emerging industry, another environmental research project that was carried

out was under the auspices of the EPA Industrial Environmental Research Laboratory in Cincinnati, Ohio. At that time the objective of the research plan was adopted through an agreement with Geokinetics and the DOE Laramie Energy Technology Center to sample and analyze emissions from a pilot-scale retort producing 30 barrels of crude shale oil per day located at the current project site. The potential pollution sources tested were the retort off-gases before and after mist elimination, the exhaust from the thermal incineration of the dry outlet gases, fugitive gases, retort water after oil separation, and evaporation pond water. The process gas streams were analyzed for criteria pollutants. Conventional pollutants and water quality parameters, organic priority pollutants, and trace elements were measured in the samples of retort water and evaporation pond waters. Findings of the research project are fully documented in an EPA published report.

One other study that has been done at the site since 1980, Geokinetics in conjunction with the U.S. Forest Service has conducted revegetation research in establishing various plant species on elevated soil surfaces resulting from in-situ extraction of shale oil. An exploratory study was conducted in 1980 on two small retorts to test fifteen species of shrubs, four species of forbs, and two species of grasses. Despite extremely heavy competition from weedy annuals, only three species of shrubs fared poorly. Geokinetics once again entered into a Cooperative Agreement with the Forest Service in 1981 to expand upon the initial test in 1980. This study was designed to provide information on the adaptability of 24 species of plants, two trees, 14 shrubs, two forbs, and six grasses. The major emphasis of the study is to test the adaptability of native species to the local area on retorts recently burned. First year results indicate even greater success than exhibited with the 1980 test. Further analysis will continue during 1982 and 1983 to acquire information on the adaptabilities of the plant species.

The extensive experience Geokinetics has acquired through environmental research conducted to date in concert with Federal, State, and local regulatory agencies reflects our ability and awareness to develop and operate an environmentally sound commercial project.

Now that I've gone through the formal part of it, I would like to show you a quick look at how it all started. When the State lease was obtained from the State of Utah we first prepared the test site and during the summer we struggled with the potholes and dust to get out to the site. During the winter the darned thing was as difficult to travel as it was in the snow, and if possible it seemed to get even worse in the spring. Facilities at the beginning were somewhat spartan to begin with but we forged ahead and began preparation of our first retort for burning. It was a very small retort and was primarily intended for an ignition test. However, being optimistic we had a 5-gallon can on hand to contain any oil we might produce. Well on the third day the retort started producing oil and it wasn't long before we filled our 5-gallon can. We had to scurry around camp to locate anything we could fill for the oil we were producing. Nevertheless it was soon necessary to run to town and buy a barrel. To make a long story short, before the first retort was finished it produced over 18 barrels of oil, and that made some people mighty happy. Following that success the project expanded quickly. Trailers were moved to the site and a complete shop and warehouse facility were constructed to keep up with the demands of the project. The size of our retorts have grown from that initial day and now although the 5-gallon can has been replaced by large storage tanks we still look for the pleasant dilemma of producing more oil than we can handle and store.

That ends my formal presentation. If you have any questions, I would certainly be glad to answer them.

MR. BOEKER: It appears the process would leave the soil profiles in place but most of the surface vegetation would be altered or destroyed overlying the topsoil.

MR. LUNDBERG: Yes, the overlying topsoil and vegetative cover would be removed in the process of developing the individual in-situ retorts.

MR. BOEKER: Do you actually remove soil?

MR. LUNDBERG: We do and stockpile it.

MR. BOEKER: I thought maybe you just leveled the soil.

MR. LUNDBERG: At first we tried to do some of that using that type of technique. At this time we are stockpiling some of the topsoil for future use. I might mention, you might have noticed after the blast was completed on that retort that I was showing the sequence of the blast taking place; after that is completed we do go back and resurface or recontour that surface, but we do save the topsoil.

MR. WATSON: Does that naturally occur? I noticed after the blast you had kind of a hump and then after you extracted the resource does that kind of return the land to its original contour and plane?

MR. LUNDBERG: Not while we are in operation. Subsequently, following the shutting of a retort, yes, then we go back and recontour the surface again, tier it, whatever we need to do to reduce soil erosion and allow for revegetation plots to take hold.

MR. WATSON: And how dramatic do you think the subsurface impact is by this method?

MR. LUNDBERG: I should say directly under the ground surface, the intervening layers between the ground surface and the retoring area itself, other than inducing some fractures, there is really no impact to that intervening vertical area.

MR. WATSON: Any estimate of the amount of rodents and other small mammals destroyed?

MR. LUNDBERG: Not really. I must admit we have not had anyone walk over it after the round was detonated and see what happened to those populations.

MR. HANSEN: What would you guess would be the maximum amount of overburden you could lift?

MR. LUNDBERG: To provide it right now, roughly 150 to 200 feet of overburden lying on the shale beds. The reason for this is that when you start adding so much to the overburden the economics tend to outweigh what you are trying to do.

MR. UTTER: What is your estimated resource recovery for say one of those one-acre tracts?

MR. LUNDBERG: The one that was recently completed we had a recovery of just slightly over 50 percent. This is what we try to achieve, our optimum goal is roughly 50 percent recovery of the in-place shale oil.

MR. ASH: Rusty, to follow-up on that, when you talk about your recovery, I believe you were talking about just your liquid recovery. Were you including the equivalent of the offgases?

MR. LUNDBERG: No, that's just the liquid.

MR. ASH: So that if you include, convert the off-gases into a barrel equivalent, your recovery then, and I think that's what most of the other projects do, your recovery then would be greater than 50 percent.

MR. LUNDBERG: Yes it would.

MR. DONNELL: You had applied in the past to the Synthetic Fuels Corporation for some sort of aid. What's the status of that now?

MR. LUNDBERG: The second solicitation for the SFC we did enter two projects, one being the Agency Draw Project which I briefly alluded to, and that would be the one developing a surface retorting facility, where you would mine the shale and subsequent secondary recovery using the horizontal process. The other project was the Wolf Den Project which we envision now as our first commercial site for strict application of the in-situ, the horizontal in-situ work. Both projects were denied on the initial cut of the second solicitation, however, and presently we are preparing to make another proposal for the third solicitation for the Wolf Den Project only.

MR. DONNELL: Do you envision that you will have any difficulty proceeding to commercial development without some sort of aid like that?

MR. LUNDBERG: Not really. It's just one pathway that we're following right now and I should emphasize that the one reason for that is that an in-situ process, particularly this application near where the bed is relatively close to the surface is that the initial capital outlay or front-end costs are extremely low as compared to a surface type facility, and that's one reason why the acronym for our process is "LOFRECO," the low front-end cost of the project.

MR. GIBBS: Do you get a heat flux to the surface from those retorts?

MR. LUNDBERG: We are presently conducting some soil profile temperature gradient studies looking at that right now. We are recording data both on a control plot which is off the retorting area as well on the retort. In fact, we had it on, the soil probe, temperature probes during the burn, and they're still on there subsequent data retrieval after the retort is shut in.

MR. GIBBS: Do I get the correct impression that one of the advantages of your processing is that you can develop scattered small tracts of land, not requiring a large blocked-up, what we would call a logical mining unit?

MR. LUNDBERG: That's correct, but particularly as we strictly talk about the in-situ work. You might notice that on that one slide that did show all the lease holdings that one was a significant sized block. That is the Agency Draw site, and would be the combined surface retorting and in-situ retorting.

MR. HOFFMAN: Whereas the scattered sections of school land would be most amenable to this "LOFRECO" method?

MR. LUNDBERG: That's correct.

MR. HEMPEL: Are you limited to two acres or one acre. is there any limitation size?

MR. LUNDBERG: Right now we don't have anything definite on what our limitation size is. One reason why we scaled up from the one acre to the two was that we looked at the data on the blast, resulting data from the blast, and we realized that possibly we could increase the size and still fracture the shale to the extent we need for air flow. So to give you a definite answer, I don't know where the cutoff is right now.

MR. ASH: Thank you very much. We appreciate your coming in through the mud. Something we skipped over a little earlier was a report on the status of the Rio Blanco Oil Shale Project, Tract C-a, and that group was having a heavy management meeting these two days and no one was able to come as I understand it. Eric said they could give us a report on that and what's happened. Eric.

MR. HOFFMAN: That was our understanding too, Hank, that they had a pretty heavy management meeting. As I summarized yesterday, the C-a project is presently in a suspended mode. The workforce is reduced considerably on tract, the Mine Manager, John Selters, has departed for Saudi Arabia. We are in the process of working with the lessee to implement the scope of work for their so-called interim or suspension period monitoring program which roughly resembles the level of monitoring that George outlined to you for Tract C-b. Rio Blanco is proceeding with the construction of facilities necessary for the Lurgi retort test in Harmarville, Pennsylvania, which should occur sometime this coming year. The reclamation bond and other bonds have been increased proportionate to the amount of disturbance on the tract. The pumping system for the mine has been revamped to simplify it and make it more cost-effective during the interim period, and certain vegetation and utilization studies are being carried out on the tract. I'm sure all of you are aware the principal reason for the June 16 application by the lessee for suspension of operations was to achieve a period of time during which they could await upon legislation that has been alluded to, promised and worked on in Congress for the past several years that would enable them to obtain, that is Interior to have the authority to lease off-site lands for placement of overburden and processed shale. This of course would be necessary for them to implement their preferred development plan which is for open-pit recovery of oil shale. By way of background, if there is any question in your minds, the Department of Interior prior to the lease sale had represented that it could and would make available lands for offtract disposal. In February 1975 the Department, following a review of its

authority to grant offtract leases, stated to Congress that it had no such authority to grant rights for the disposal of processed shale on Federal lands other than that subject to an oil shale lease. Bills to authorize the granting of offtract leases for disposal of waste were introduced in both houses of Congress by request in 1975 and several times since then. Unfortunately none of these bills have ever been enacted. It should be pointed out that the lessees to date have expended on tract C-a some \$330 million for both acquisition of the lease and for development tests that they have carried out. About \$126 million was paid for the first three bonus bid installments and some \$204 million was spent on development. That includes both the part that was offsettable of the bonus payments and that which was spent in addition to the offsettable amount. So C-a has proceeded in what we consider to be a diligent manner to try and develop the tract or to come up with a methodology that might be used if open pit recovery is absolutely precluded by nonexistence of authority for Interior to lease offtract land. At the moment that is kind of how things stand on the tract. Some of the mobile facilities that were brought out for laboratory space during the two modified in-situ test runs are being moved off tract. If things remain as they are, the mine will continue to be pumped and the monitoring program will continue to be operated.

MR. ASH: Comments or questions from the Panel? Bettie?

DR. WILLARD: I need refreshing as to why the modified in-situ was not a satisfactory way to develop the tract.

MR. HOFFMAN: Under the geotechnical conditions on tract C-a if it were possible for you to open-pit recover the oil shale you might be able to produce better than five billion barrels of shale oil. If you are limited to some type of underground mining method, let's say room-and-pillar or in-situ as we presently understand it, you might produce two billion barrels. So your resource recovery goes up dramatically if you can open-pit the tract. In fact, the thesis of resource conservation which is one test that the Oil Shale Office applies to any technology proposed by the lessees for these tracts would be better satisfied with an open pit recovery method than with other methods.

DR. WILLARD: How close can each of the in-situ retorts be placed to each other?

MR. HOFFMAN: That's a very good question. We don't know yet just how close you can put a group of modified in-situ retorts together. It depends on overburden depth, a lot of rock strength characteristics, how high, how wide, how tall you ultimately decide to build them. This is something that C-b was going to look at in their early phases of development on Tract C-b under the existing development program.

MR. OUELLETTE: Are you saying that unless this legislation is passed there is a possibility that there is no financial recovery at all?

MR. HOFFMAN: That's a tough question. I would say that the lessee probably would not find it advantageous to proceed with development of the tract, that is, the present group of lessees would probably not proceed.

MR. WATSON: As you are probably aware, there are a couple of versions of that legislation being considered. Is there some inconsistency, Eric, in the fact that White River has been able to use, and I'm in favor of it, but why White River has been able to use some off tract BLM land, not for the storage of overburden or spent shale but nevertheless they have had access to offtract BLM land, yet the Rio Blanco has been consistently denied this type of access?

MR. HOFFMAN: Not per se. In other words, all of the lessees have had an opportunity to offtract Federal lands through various permitting situations with the BLM for corridors, for roads, highways, powerlines, gas lines, they've all enjoyed that opportunity. They have had the opportunity to use offsite land to conduct their environmental monitoring activities and in the case of the White River Project a corner of one of the dams, the main retention dam that they're talking about in their DDP modification sticks off tract, and they have applied for a BLM permit for that site. It's when you get down to the issue of siting large waste disposal areas or plant facilities that the line seems to be drawn.

MR. LOWELL MADSEN: Clarke, you may recall that in 1976 Congressperson Schroeder added an amendment to the Federal Land Policy and Management Act specifically prohibiting the Department from making available to oil shale companies lands for spent shale disposal, and so until that amendment is somehow modified the Department has no authority to lease or permit the dumping of spent shale on other Federal lands. It might also be helpful to point out that this suspension runs for five years or until a lease is issued, whichever occurs first, and the Secretary retained the discretion to extend the 5-year period if he felt it would be in the public interest, so there is a cap on it, with a safety valve.

MR. HOFFMAN: That's about it for C-a at the moment, Hank.

MR. ASH: Okay. Thank you, Eric. I appreciate that. I wanted to bring it up so the Panel could raise questions and get a little discussion as desired by the Panel. Clarke.

MR. WATSON: By way of information, if anyone is interested Blaine Miller transferred to Houston where he is now Vice President of Corporate Acquisitions for Gulf, and Dick Lieber is now President of Rio Blanco and Ted Neptune is now at Amoco Oil and Tom Ten Eyck is at Amoco Minerals.

MR. ASH: Thanks. We have another report item on the agenda and it is in response to some discussion we had at our past Panel meeting regarding the potential of acid rain becoming a problem. Our Air Quality Group was going to look into that. We've been getting some changes in the workgroups and we don't have all the members here. We want to turn to that and we want to cover another item under the same heading, which is kind of connected, and Paul Ferraro from the State of Colorado has brought copies of a report which he can explain which does touch on acid rain, and he and Larry Svoboda from EPA have some other information on the acid rain question. I'm not sure if any other members of the Air Quality work group may have some remarks.

Mr. SVOBODA: My remarks will be rather brief. I have a 1-page summary of the acid rain research that's being conducted in Colorado, and some of this will certainly

affect or have implications for the oil shale industry. Since I only learned that I would be participating in this group last Thursday I didn't have enough time to really prepare a detailed presentation on the research and the results to date, but if the Panel would like that kind of a discussion at a future meeting I'd be glad to prepare such a presentation.

MR. ASH: I appreciate that very much, Larry. Since you all don't have a formal chairman I will ask Paul to speak now.

MR. FERRARO: Okay. What you're receiving right now and there should be a copy for every Panel member is the report I talked about the last time we met in Glenwood Springs and gave you some preliminary results and talked about what we were going to cover. So here is the draft. The memo says you've got until the end of October to provide us with your review and comment, and we would appreciate that. You can direct them to our office. So make sure you get a copy of the memo because it tells you what you need to do.

Hank, if it's all right with you, if the Panel members just send their comments to us and we will review them in the light of all the other comments we get. That will save you having to gather them up.

MR. ASH: That's fine. We don't really have any official status to advise the State, I think it should be up to the individual members, we're certainly free to discuss it here or at some other meeting.

MR. FERRARO: If any one else would like a copy, just give me your name and we'll send it out this week. Okay. One of the items in there that we tried to cover, its initial aspects, is Acid deposition, and what we did is we looked at some work that was done by John Turk, USGS, in Denver, and we wanted to utilize that work in our analysis. First of all, before I explain what we did, I'll tell you a little about what John did. John spent last summer out in the Flattops Wilderness Area collecting data, all kinds of data, and looking at the general area in terms of the lakes. He was taking samples from the lakes, he analyzed the pH of the lakes, and then what he did was he spiked that lake water with acid, the normality is in his report. The copy of his report that I have, is this one, and the title of it is Sensitivity to Acidification of Lakes in the Flattops Wilderness Area, Colorado, and I guess if you are interested in a copy of that you'd have to contact John Turk at the Lakewood office of USGS. When I met with John back in January and listened to his presentation on his work, what he developed was a set of curves that you will find in the report that looked at the sensitivity of certain lakes in terms of their buffering capacity, and he developed curves that showed for a poorly buffered lake how quickly the pH would drop in the lake as you continue to increase the acidity by adding acid to the lake water. So for a poorly buffered lake you'd see the dropoff in pH would come very quickly. For a well-buffered lake you would also see that it was a lot more gradual and would hold its own for a while, then eventually drop down very rapidly. My response to John was, "Why can't we take some of the work that we're doing and relate that to actual emissions from the region and look at the impact, the projected emissions would have on the pH in those lakes." I guess my first question was, "Can we do it?", and his answer was, "Yes, we can do it." Well John and I went back and forth for several months trying to get his willingness to assist me in doing that, because I

felt my chemistry was a little weak to do the actual calculations myself. What finally ended up, we finally did get, and you'll find it in the report if you look at that section which is the last few pages of the Air Quality section, we do show first of all, we show in the report, I'll start at the last of it, we showed that if you take the emissions that are going to be discharged, that we projected will be discharged in Colorado from all sources. Now we included the oil shale facilities. we included powerplants and others in arriving at our total projection. We then looked at what would be a reasonable deposition rate. Now we got our deposition rate from work that was done by Systems Applications Incorporated of California. They have done a lot of work for BLM in the Uintah study. So we were able from their technical report draw upon that to arrive at our deposition rate, and if you look in the report I do have a value, I'll give you the page, page 34. Based on all of our Scenario 3, and I won't take time to go into all that, we came up with an estimate of 2.16 grams per square meter of sulphur dioxide and hydrogen oxide deposition in the Flattops area, and you'll have to accept that for now. Based on that figure, then using the work that John Turk did, we arrived at the next figures which would say given that rate of emissions and then that projected rate of deposition, it appears that looking at the two lakes, one poorly buffered and one well buffered, that the change in pH would be lowered on a well-buffered lake to 8 from well over that and a poorly buffered to 5.8 from 6.8, 6.7. So we're just showing what the impact is. The thing I was not able to do was to say, over time what will happen to the pH in those lakes - does it take in one year, taking in several, the assumption, the thing we wanted to do was to make a jump here and take a leap and be a little bold in trying to address the potential problem. There are a lot of unknowns, a lot of questions yet to be answered, but at least it was an attempt here to say Hey, we could at least try to look at it.

The other thing which I did which is not published in here, is I first said well, since everyone questions what is a good deposition - any of you who are involved with air modeling, one of the big issues is what is the deposition rate, what can you expect to happen, and it's only recently that some of our modelers in the air quality are stepping out to say It appears that we can give you a number now. But prior to that they didn't, so one of my first analysis was to say well, I'll just guess. I'll take a percent and I'll draw a curve and I'll see what happens, and I did do some of that work and it's kind of interesting to see what happens. But fortunately from the work that BLM spent a lot of money hiring SAI we could at least zero in on their deposition rate. Whether that's right, you know, we're sure that that's not the exact number but hopefully it's in the ball park. In checking with some other people it appears that that number seems reasonable. I don't want to claim that any of these numbers are precise.

The other thing we did that's in the report, again we looked at John Turk's work and one of the things that John Turk said was that based on his analysis that lakes above 11,000 feet are more sensitive to acid deposition and have a very low buffering capacity, and need to be looked at in a lot more detail. So on page 35 we identified and in the draft the printing is a little light, it shows the areas in the region that we were looking at. We have a lot of lakes that are above 11,000 feet, and potentially they are sensitive to acid deposition. Obviously the two areas of most concern are the Mount Zirkel Wilderness area and

the Flattops Wilderness area and then there are some scattered out through there. So that's what we attempted to do with acid deposition in this draft report we've put together.

MR. WATSON: May I ask a lay question? I think I know but what do you mean by the term "buffered"?

MR. FERRARO: Okay. As you increase in terms of rainfall the lowering the pH in the rainfall, that water will hit the area, the drainage area, and as it is moving through the soil or whatever into the lake there's an alkalinity, the opposite, a basic, a neutralizing effect, and what we mean by buffering is the neutralizing effect, and some of the lakes have a very poor - there's not enough buffering capacity there. So in the one lake the soil and the rock formation or whatever, that doesn't help you, and as you are well aware of in the Northeast of the United States and Sweden and other countries, this has become a very serious problem. At least we tried to make a first cut at it and we will see what kind of reaction we get from the comments over the next month, the thing that you don't know is do you have a lot of buffering capacity in terms of limestone available. As you provide more acidity is the material there to neutralize it readily available, or the other side of the coin is at some point once you start working on that buffering capacity in a number of years it's gone, and so you keep adding this acidity, it's no longer there, it doesn't do you any good. That's a big question, and I am not even attempting to answer that question because we don't know enough about it, especially in the Flattops. Those are some of the kinds of questions that need to be answered in the near future, to help us get a better handle on this in terms of potential impacts. Are we going to wipe out all those lakes in 5 years, 10 years, or never? Or are we going to wipe them out in one year?

The other thing we did not look at which is very critical is that shock loading, you store - the acid is stored in so to speak in the snow, and then all of a sudden you get a flush and what's going to happen then? We cannot address that either.

MS. GRASSER: As you are aware, the Park Service has a running disagreement with SAI in their study of the Uintah Basin on which the air quality portions of your report are based, basically having to do with what they claim is the conservativeness of the RTM model. The Bureau of Land Management I think in self defense and after getting tired of fighting with us on it has finally agreed to do three additional computer model runs which we hope will one way or another decide if the Park Service is right and the report grossly underestimates emissions or if the Bureau is right and the report is correct, that RTM is the more reasonable model. SAI has estimated 6 weeks to do the extra modeling runs for us. If they in fact do these runs in that time period is that enough time to allow you then, depending on the outcome, to use the new numbers, if there are new numbers, in your report, since that would directly affect your acid rain predictions as well as the air emissions predictions?

MR. FERRARO: It's getting close in time. Let me talk to that concern a little. If you back up a few pages on the air quality and you look at the PSD increment consumption, what we did there was hire Systems Applications, Inc., to run our scenarios our three oil shale scenarios, use their computer model that BLM paid for the development cost, and we were able, being a State agency and not having

too much money to for a few dollars get the runs, at least just pay for that cost, and we do appreciate BLM's allowing us to do that, tying in with that work. So what we did with SAI, we said, "Okay. Here's our scenarios. Now tell us what the increment consumption, the PSD increment consumption will be in the Flattops area and others of the Class 1 areas," and the results of that are on page 32. Now this is for only oil shale, all right, and you're looking at Scenario 1, we're talking about 180,000 barrels in Colorado and Utah, Scenario 2 is 529,000, and Scenario 3 is 1,163,000 for the two states. What they did is, they have a model, the model that they use is the Gaussian Puff model, and we have some results, and if you look at that you will see that for the 24-hour, looking at the Flattops region, you show violations for our Scenario 1. In other words, we're going to use up all the increment before we even get a good start. I'm sorry I was getting some figures mixed up. Now if we go back to page 32, what that's saying is, using their model, we're showing violations with the short-term standard, with less than 180,000 barrels a day. You can see that throughout that whole part of the table. Okay. This is where the disagreement comes in, and some of our people question it too. Our air quality experts are in agreement with what Mary Anne is talking about. They're not sure and they have some concern. What they did was they ran the model, they used the Gaussian Puff model. They ran all our numbers through it and came up with these results, and they're shown there. They did a short-term, what they call a regional transportation model, and they found that the numbers were not as conservative as the numbers in the other model, and they made an adjustment. There is where the discrepancy and the disagreement fall in. What we did is we said, Okay; there are the results of the two analyses. We also say in the report, "SAI says that the ones on the bottom are better numbers." That's still out in terms of the final analysis. What Mary Anne is saying is they are going back and take a second look at it.

MS. GRASSER: Frankly, one of the reasons we were concerned all along and as Paul said, members of the State as well as almost everybody on the Technical Policy Committee has the same concern. The problem, from our perspective, with the numbers that the RTM does is that they only did one run of that model, and we're not convinced that if you ran that model on another day under different meteorological conditions that you might not come up with a number that is different, and therefore we have a tough time saying that automatically because one run gives you a better number than that's the right answer. It is also, coincidental, I think that the RTM run just so happens that if you divide those numbers by 5, which is what they do when they only look at direct emissions, or divide them by 10 if you look at direct plus secondary, or divide them by 25 if you look at direct plus secondary plus other sources, comes up underneath the standard. That is all real squishy, and like I said, the new additional runs should validate it one way or another. We really hope we're wrong. We really do hope the BLM is right on that one, but we will see.

MR. FERRARO: Well that's going to be under discussion for a while. And we've got to pay our modelers for a few more years to keep them busy I guess. But in here I do make a statement that SAI stands behind those numbers and that's their best engineering judgment. SAI believe that the adjusted results are more realistic and that is what they say. The thing that you have to remember, we did not, unfortunately, and I would hope that some time down the road we do, look at all

the sources. The powerplants are not in that on page 32. The other emissions are not on page 32. It's just oil shale. So the analysis would have to be done putting everything into the computer, all the emissions and then come up with an assessment as to what level of development could take place without violating the PSD increments in the Flattops and Mount Zirkel.

MR. WATSON: Well Paul, it appears someone looked at the powerplants. There's a figure here that says 38,890 tons per year of SO<sub>2</sub>.

MR. FERRARO: Yes, they're there as an estimate of what's coming out, but they were not put into the model. We just were not able to do that at the time we ran these because of time and cost, they're not in there. We'd have to go back and pay for development costs, which we didn't have the resources to do to get that all in and get a nice run that would show everything. The report does make an estimate of the projected, based on our scenario now, of what we see the powerplant emissions are going to be, other sources and oil shale, but they're not in here.

MR. WATSON: Another question relating to that concluding paragraph. The assumption on the emissions under these various scenarios, does that assume that the operators do nothing to abate those emissions? (Oh no.) This is under allowable standards.

MR. FERRARO: This is under some high levels of removal of the pollutants, oh yes.

MR. ASH: We have a volunteer from the audience to comment on that. Dr. George Fosdick, if he has some information that would help us we'd be glad to receive it.

DR. FOSDICK: I had the opportunity to review the recent two EIS's, the Uintah Basin EIS, the Prototype Oil Shale EIS, and the Technical Document for the Programmatic EIS, and the Uintah Basin one was modeled by SAI, and used both models that you allude to, where they felt that the regional transport model was the best model application for regional work. In that model and study they did have all the sources in both Utah and Colorado, and from other work that we've looked at, they came up with approximately the same production capacity limit in Colorado of 800 and some thousand barrels per day as being consistent with consumption of PSD increment in Class 1. So I would disubscribe to the same level of finding that you have in your report. In that EIS they clearly state the modeling uncertainty of a factor of ten, and I think that that should be underscored for all nonmodelers and the public at large, that there is a vast uncertainty in both the model and in the regional meteorology, particularly the regional meteorology because the worst case that you assume has everything to do with the answer that you come up with, and right now we have a very bad need, in the Piceance Basin region of Colorado, to have a real time meteorological network of acoustic doppler of radars that would get data for, say, a year, and the Uintah Basin also needs that as well as modeling improvements, and I think we can expect that as the degree of sophistication and as the capacity is used in the basins that the models will improve and the regional meteorology will improve to increase the limit from this 800,000 barrels a day. I want to underscore again that SAI points out a modeling

uncertainty of a factor of 10, so you should not take any number given by them in your report or theirs as gospel without underscoring that uncertainty. I'd like to make another comment too.

On a number of the API's air quality task force that is kicking in \$20,000 so that John Turk can instrument another station for acid precipitation at the present time, so we will have 3, I believe, Douglass Pass, Marvine Creek, and the Bear Mountain Station. We heartily subscribe to the work of John Turk and the USGS, but we do feel that on acid precip you should not only look at the lakes themselves but on the watersheds when they come down to lower levels and do some water quality analysis of the emerging watershed as well as the high altitude lakes because that's where the proof of the pudding is when the water comes out of the watersheds themselves.

MR. WATSON: Well could you improve that factor of 10 if you used 9 more days, would that make Mary Anne happy?

MR. ASH: I think this has been an interesting discussion. I appreciate the work you all have done, the information brought to the Panel and discussed this morning. What I would propose to do is ask our Air Quality Group to kind of stay on top of this and report back at subsequent meetings and give us perhaps a "puff-by-puff" account of the modeling. There may come a time when the Panel can do something constructive in this area, but I think it was a very interesting discussion.

I said I thought we had an hour or an hour and a half more to do. We've been at it about an hour and 20 minutes. One other thing I wanted to give, or to have for the benefit of members and the audience, Tom Owen from Laramie Energy Technology Center in Laramie is going to give us a status report on them and their program, or that center and their program. Some of you may be aware, it has been subject to some plans for possible radical modification. Is that correct?

MR. OWEN: Yes, that's pretty correct. The Department of Energy, without any legislative guidance is proposing to defederalize three energy technology centers. Coincidentally these three are in the western United States and are not sheltered by powerful members of Congress. Those being Laramie, Grand Forks, and Bartlesville. The Laramie Energy Technology Center, the Department of Energy proposes to contract all in-house research to the University of Wyoming. The proposal, the solicitation was delivered to the University September 7, about a month behind the original schedule, requesting that the University submit their proposal by September 20, the University has already said that they will be at least a month late on that. The solicitation is worded to the effect that the University is required to employ as many LETC employees presently there as possible to fulfill the program objectives which will not change. The language does not require that an offer be made to every employee presently there, but the employees are given first right of refusal on these jobs. Another development that could further delay this action is that in the supplemental appropriations bill that Congress overrode the President's veto on, there was some specific wording that DOE must submit a plan to Congress regarding the disposition of these three energy technology centers showing cost savings, which will be interesting to see how they try to show cost savings, and the actual contracts. This is

estimated to cause at least 2 to 3 months' time delay. It could be more, depending on what happens in November with the elections. There will remain a Federal program office at Laramie. Currently they estimate that to be ten people that would maintain the three on-going project managers in oil shale, coal gasification, and tar sands, a director, and then the rest of the staff would be technical contract managers, in effect. This coupled with reductions in force in headquarters would leave the shale office with probably a Federal staffing in the Department of Energy of about eight people and not all of those would probably be full time. Other than that, if anyone has any specific questions I can try to answer those.

MR. ASH: Does it appear you have funding to continue operations in the next fiscal year?

MR. OWEN: Yes, the wording in the appropriations bill was such that the Department of Energy cannot lower the manpower levels or the operating budgets for FY83 until these contracts are in place.

MR. HOFFMAN: Do you have any appreciation of how this would affect the satellite office in Grand Junction?

MR. OWEN: It's uncertain right now as to what will happen to the Grand Junction office. There is a good possibility that unless oil shale activity picks up that that office would be closed. In the staffing level of 10 people at Laramie there is a remote site coordinator.

MR. ASH: Thank you, Tom, I just wanted to get a report to quite a few of us here who are familiar with Laramie and we hope things work out for you individually and collectively, one way or another.

We have received one other item recently that relates to White River which we haven't formally discussed, and I don't propose to devote any significant amount of time to it here. We just got this late last week, to some of the members, and then at the Panel meeting to the balance of the Panel, and that is this report was described briefly by White River yesterday. It is White River Shale Project Financial Impact Statement and Alleviation Plan. If there is anyone who has any comments on it at this time we'd be glad to receive them. In the meantime and I discussed this briefly with Rees before they departed. I will ask Panel members to review it, especially those in the Socio-economic Workgroup and provide any comments or questions they may have, and we'll try to make that in the near future. I wouldn't propose to try to come up with a Panel position or recommendation, but just to try to identify any concerns or comments that come from our review of this in the next few weeks, hopefully, or a month. But I would ask if anyone has had a chance to look at it to the point where they would have any comments or questions they would like to raise at this time. We still have representatives from White River here. Any comments or questions on that at this time? You all must be getting hungry.

The only other thing is something called wrap-up of Panel business here that I see on our agenda. The main thing we usually talk about then is when we might schedule another meeting. I would like to check with the Oil Shale Office

and see if Eric can tell us any major item or action that may be coming to us from his office for review in the immediate future or near future.

MR. HOFFMAN: In the near future I think you've got everything, the principal issue being the White River DDP modification at the moment. We don't expect any other major plan changes coming along for several months. Probably the next major action that would be of interest to the Panel members would be the outcome of the effort to lease one or two more tracts in the Piceance Creek Basin early next year.

MR. ASH: Is BLM aware of anything that they might be coming to the Panel with, I wonder?

MR. SMITH: No, Hank, I think like Eric said, probably just the outcome of the environmental statement and the decision by the Secretary.

MR. ASH: We will endeavor to keep the members informed of these other matters related to oil shale as they go forward with appropriate documents and information and as they are available to us we will try to keep you all well informed of that. Obviously there's not going to be any need for a Panel meeting in the next few weeks, probably not before the end of this year, so I would estimate that it would be early next year before we would call another Panel meeting unless something new develops in the interim. The other thing, of course, on which is dependent when and where we have another meeting, is if our charter is renewed in the next 30 days or so, and I will also keep you all informed of that. Are there any other matters of business or other matters to come before the Panel? Clarke.

MR. WATSON: Yes, my question to you is do you see any problems or is it just a routine sort of thing? We should know.

MR. ASH: I'm not sure frankly, Clarke. The Atmosphere was favorable toward the Panel when I was in Washington. The time that it takes, the mechanics to actually get it accomplished is really, frankly, running short. We have about a month. I think there is time if somebody gets with it.

MR. WATSON: But the Panel is not protected by powerful eastern senators. I was thinking if we need to do anything we should know early enough because I'm sure there are many on the Panel who have their own accesses to Congress. Let us know if you need help.

MR. ASH: You didn't think I was really going to ask you for it, did you? Let your conscience be your guide. Bettie?

MS. WILLARD: The Thorne Ecological Institute is going to have a symposium on Cumulative Impacts on Wildlife of all types of technology and development in the West. It's going to be in Steamboat Springs November 15 through 17 and we invite all of you to come and take part. There's going to be symposium proceedings too if you don't get to come.

MR. ASH: Bettie, if you'll provide me with a copy of the announcement or something we can distribute that to the members, if you'd like, in our next mailing, we'd be happy to, or can we give them an advertisement? They're nonprofit, we can distribute information for them I think. Are there any other matters to come before the Panel at this time? Well, I thank you all for coming, and I will now declare this meeting adjourned.

Meeting adjourned at 1:05 p.m. Wednesday, September 29